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CEDAR CREEK RANGE EAST PROJECT EA

Houston/Rolla/Cedar Creek Ranger District

Township 46N, Range 11W, Section 1, 12, 13, 15, 22, 23, 26-28,
Township 46N, Range 10W, Section 7, 8, 24, 25,
Township 47N, Range 11W, Section 12, 36,
Township 47N, Range 10W, Section 7, 16, 27, 28, 30, 31,
Township 48N, Range 10W, Section 20, 32,
Callaway County, Missouri

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CHAPTER 1 – PURPOSE AND NEED FOR ACTION

Introduction

The Forest Service prepared this Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations. This Environmental Assessment will disclose the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. It also provides the supporting information for a determination to prepare either an Environmental Impact Statement (EIS) or a Finding of No Significant Impact.

Additional documentation, including more detailed analyses of project-area resources, can be found in the project planning record located with the NEPA Coordinator at the Rolla Ranger District Office.

Document Structure

This EA for the Cedar Creek Range East project is organized into four chapters with four appendices:

Chapter 1 - Purpose and Need for Action: This chapter includes information on the history of the project proposal, the purpose of and need for action in the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.

Chapter 2 - Alternatives Considered: This chapter provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on issues raised by the interdisciplinary team, public, and other agencies. This discussion also includes mitigation measures if any. Finally, this chapter provides a summary table of the environmental consequences associated with each alternative.

Chapter 3 - Environmental Effects: This chapter describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized by Physical, Biological, and Social Environments where individual resource topics are addressed under each of these headings. In this chapter, each resource specialist identified the existing condition, direct, indirect, and cumulative effects for their resource and evaluated both the short-term and long-term productivity of each alternative proposed for implementation.

Chapter 4 - Project Consultation and Coordination: This chapter provides a list of preparers and agencies consulted during the development of the Environmental Assessment.

Appendices: The appendices provide more detailed information to support the analysis presented in the Environmental Assessment.

Appendix A – Glossary of Terms

Appendix B – References Cited

Appendix C – Cedar Creek Range East Project Maps with Table 3 (Project Activity Table)

Appendix D - Response to Comments

Background, Location and Setting

The project area is located on 25 separate tracts of National Forest System lands totaling approximately 4,712 acres of open pastures through-out the Cedar Creek unit of the District (Please refer to maps in Appendix A). Lands that make up the Cedar Creek Ranger District were all privately owned prior to 1937. In the early 1940's the U.S. Soil Conservation Service purchased the land. In 1953, the land was transferred to the U.S. Forest Service for administration and management with additional lands acquired by willing sellers over time. These 25 grazing allotments are on National Forest System Lands and have been managed as a grazing resource since acquisition.

The project areas are generally cool season (approximately 64%), open land pastures. Warm season pastures also exist on (approximately 36%) the project area. Open pasture lands provide edge habitat for a variety of wildlife species including grassland birds, game birds, raptors, small mammals, and white-tailed deer. The 2005 Mark Twain National Forest Land and Resource Management Plan (Forest Plan (FP)) designates the area for Management Prescriptions (MP) 1.1, and 2.1.

Five (5) Range Allotments (502, 503, 702, 1901, 2001) are located entirely in the Claypan Till Plains Subsection of the Ozark Highlands Section and is dominated by the Grand Prairie Prairie Plain land type association. General description of this LTA can be found on page 45 of the Atlas of Missouri Ecoregions (Nigh and Schroeder, 2002)

Nineteen (19) allotments (101, 102, 103, 104, 105, 106, 201, 202, 203, 204, 205, 301, 401, 501, 701, 801, 802, 901, and 1001) are located entirely in the Outer Ozark Border Subsection of the Ozark Highlands Section and are dominated by the Central Missouri Oak Woodland/Forest Hills and Central Missouri Savanna/Woodland Dissected Plain land type associations. General descriptions of these LTA's can be found on page 138-139 of the Atlas of Missouri Ecoregions. (Nigh and Schroeder, 2002)

One allotment (601) is split between the Claypan Till Plains Subsection and the Outer Ozark Border Subsection.

The Mark Twain National Forest has been actively implementing principals of restoring fire-adaptive ecosystems in these and adjacent project areas for the past ten to twenty years. The Houston/Rolla/Cedar Creek Ranger District has previously prescribed burned some of these open land grazing areas. The objectives of the past prescribed fires have been to restore and maintain open land pastures and specialized habitats. These objectives were successfully met with little or no negative impacts to the physical or biological resources.

Forest-wide Direction and Goals

The 2005 Forest Plan (FP) which is currently in effect provides guidance for all resource management activities on the Mark Twain National Forest. A copy of the 2005 Forest Plan can be found at: <http://www.fs.usda.gov/goto/mtnf/plan>. It establishes: forest-wide multiple-use goals and implementing objectives, forest-wide management requirements (known as Forest-wide Standards and Guidelines), management area direction and management practices, and

desired conditions. A management area is a portion of a landscape with similar management objectives and a common management prescription. The Cedar Creek Range East project lies in Management Areas (MA) 1.1 and 2.1. A brief description (from the Mark Twain Forest Plan) of the Forest wide Goals and Objectives, Forestwide Standards and Guidelines, Management Prescription themes, goals, and desired conditions is provided below to set the foundation for the Cedar Creek Range East project “Purpose and Need for the Proposed Action” coming up in this document. Approval of any project must be consistent with these parameters (16 USC 1604(i)).

Forest-wide Goals and Objectives (FP, pp. 1-1 to 1-8)

The Cedar Creek Range East Project is designed to meet the Forest-wide Goals and Objectives as stated in Chapter 1 of the 2005 Forest Plan. Activities in this project would contribute to the social and economic well being of local communities by providing a variety of uses, values, and products that are within the capability of the land. The Cedar Creek Range East Project would also move toward meeting the following Forest-wide goals and objectives:

Goal 1.1 – Terrestrial Natural Communities

Maintain, enhance, or restore site appropriate natural communities including the full range of vegetation composition and structural conditions.

Goal 1.2 - Non-Native Invasive Species

Prevent new invasions and control or reduce existing occurrences of non-native invasive species.

Goal 1.3 – Soils, Watershed and Water Quality

Establish and maintain riparian management and watercourse protection zones to: maintain, restore, and enhance the inherent ecological processes and functions of the associated aquatic, riparian, and upland components within the riparian corridor.

Goal 2.1 – Public Values

Within the capability of sustainable ecosystems, offer benefits that contribute to the social and economic well-being of the local and regional communities by providing a variety of uses, values, products, and services that are cost effective for present and future generations.

Goal 2.7 – Range Management

Within the capability of sustainable ecosystems, provide range forage on open lands in response to demand.

Encourage the restoration, establishment, and management of native grass communities on ecologically appropriate sites.

Restore and sustain the distribution and quality of native vegetation in range management units by increasing species diversity and eliminating the spread of non-native invasive species.

Manage cool season pastures to provide quality forage that includes a variety of cool season grasses and forbs.

Forest-wide Standards and Guidelines (FP, pp.2-1 to 2-42)**Rangeland Management (FP, pp. 2-20 to 2-21)**

Control the timing, duration, and intensity of livestock grazing to achieve desired structure and species composition objectives.

Allow grazing only in those areas with adequate fencing for control and management of livestock.

Grazing is not allowed within 100 feet of springs, significant seeps, fens, other wetland features or the break of a sinkhole basin.

Grazing shall not be allowed to degrade the RMZ or WPZ, or their functionality.

Reduce livestock impacts and achieve desired structure and species composition objectives within the WPZ and RMZ by using tools such as hardened crossings, fencing, and controlled timing, duration, and intensity of grazing.

Management Prescription Themes**Management Prescription 1.1 Theme - Natural Community Restoration, Roaded Natural Recreational Opportunity Spectrum (ROS)** (FP, 3-3)

This management area emphasizes restoration of natural communities while providing a roaded natural recreation experience. MP 1.1 consists of biologically distinctive ecological areas, each differing with respect to flora, fauna, natural communities, watersheds, and landform. The desired condition will vary based on the characteristics of respective natural community types as described for each management areas. The intensity of natural community management may vary according to resource quality and type, access, land ownership patterns and capability to respond to management activities.

Management Prescription 2.1 Theme - General Forest, Roaded Natural ROS (FP, page 3-11)

This prescription emphasizes multiple use resource objectives while allowing for the enhancement of natural communities, improvement of forest health conditions, and roaded natural recreation experiences. Multiple use resource objectives provide a wide variety of goods, uses, and services including wood products, forage, other products, visual quality, developed and dispersed recreation opportunities, and habitat for a variety of terrestrial and aquatic wildlife, fish, and other biota.

Management Prescription Goals**Management Prescription 1.1 Goals** (Forest Plan, page 3-3)

- Focus restoration efforts in areas that collectively represent irreplaceable concentrations of distinctive biota, and that represent the highest quality natural communities in Missouri.
- Restore, enhance and maintain the structure, composition and function of distinctive terrestrial and aquatic natural communities.

- Restore the ecological role of fire in natural communities.
- Provide a variety of uses, products and values by managing in support of desired ecological conditions.

Management Prescription 2.1 Goals (Forest Plan, page 3-11)

- Provide a variety of uses, products, and values by managing within the capability and resource potential appropriate to natural communities and the landscape.
- Manage terrestrial and aquatic natural communities to enhance and retain their characteristic ecological elements.
- Provide a wide diversity of habitats to meet the needs of plants, fish, and wildlife species distributed across the Forest.

Management Prescription Desired Conditions

Management Prescription 1.1 Desired Condition (Forest Plan, page 3-3)

- Ecosystems are healthy, resilient, and resistant to diseases, insect infestations, and non-native species invasion. Natural communities are present in the amounts, distributions, and variability characteristic of Missouri's pre-settlement landscape.
- Plant species distributional patterns, abundance, and diversity increase following management activities.
- Prescribed fire emulates historical fire regimes, creating variable patterns of vegetation structure and abundance that meet habitat needs for associated wildlife.

Management Prescription 2.1 Desired Condition (Forest Plan, page 3-11)

- Vegetation consists of a variety of stand sizes, shapes, crown closures, and age structures in patterns that simulate the structural variability of natural communities.
- Areas exhibiting old growth characteristics comprise 8% to 12% of the management area.
- Regeneration openings comprise 8% to 15% of each management area. From 1% to 5% of these regeneration openings are ≤ 2 acres in size.
- Natural communities are distributed similar to historical vegetation patterns.
- Recreational opportunities provide for interaction between users ranging from moderate to high depending on the specific location.

Cedar Creek Range East Project Purpose and Need for the Proposed Action

The purpose of authorizing grazing is contained in several levels of Forest Service regulations and policy. In compliance with the National Environmental Policy Act (NEPA) and 1995 Rescissions Act, the purpose of this project is to authorize livestock grazing on 25 existing grazing allotments on the Cedar Creek unit of the Houston/Rolla/Cedar Creek (HRCC) Ranger District. (See Table 2 in Appendix A) The National Forest System Lands within these 25 allotments have been identified as suitable for domestic livestock grazing in the 2005 Forest Plan. It is Forest Service policy to make forage available to qualified livestock operators from lands suitable for grazing consistent with land management plans (FSM 2203.1; 36 CFR 222.2 (C)).

Under the current grazing management, the allotments are meeting desired conditions in a desired timeframe. In order to continue to meet desired condition through existing management techniques the following maintenance would be completed:

- Maintain range infrastructure (i.e. gates, fences) to improve rotational grazing;
- Maintain existing water developments to enhance livestock distribution;
- Maintain openlands through mowing, hand cutting, seeding, fertilizing, liming, mechanical treatments of non-native invasive plants ;
- Maintain warm and cool season pastures to provide quality forage that includes a variety of warm and cool season grasses and forbs.

The Houston/Rolla/Cedar Creek Ranger District is proposing to authorize livestock grazing in a manner that continues to meet Forest Plan Goal and Objectives and desired conditions. The primary purpose of this action is to provide range forage in response to demand and maintain open pasture and native grassland communities. Open and semi-open lands are important habitats for approximately 200 plant and animal species. These areas provide habitat structure different from that found in dominant forested and agricultural lands. In this part of Missouri, open lands are constantly declining in size and diversity due to woody plant invasion. Before European settlement, Native Americans used fire to maintain open land conditions. For the sake of those wildlife species that utilize open land habitats, there is a need to maintain some open land communities. Currently there are 4,675 acres of this habitat on 25 grazing allotments. The District is proposing this action to maintain these open lands and also to bring the allotments into compliance with direction in the 2005 Forest Plan.

Proposed Action

- This project would issue Grazing Permits and Allotment Management Plans (AMP). The AMP's would implement an adaptive management approach (FSH 2209.13, Chapter 90) which will specify the maximum limits or parameters for the appropriate timing, intensity, frequency, and duration for grazing. Annual Operating Plans with permittees will be in place.
- Maintenance practices to include: mowing, hand-cutting, seeding, fertilizing, liming, mechanical treatments of non-native invasive plants, water source and fence maintenance. The above actions have been variously implemented within the previously existing, grazed, and maintained allotments, and constitute a continuation of ongoing activities; therefore, they are not anticipated to result in additional ground disturbance. (Note: Herbicide treatment of invasive species could also be utilized as a result of the Forestwide Integrated Non-native Invasive control decision made on 2-14-2012.)
- AMPs will comply with the 2005 Forest Plan and are designed to use cattle grazing to help meet wildlife objectives while minimizing impacts to other resources such as soil, water, and aquatics. There are no Threatened, Endangered or Sensitive species known to occur within the fields which are currently being grazed on HRCC.
- Monitoring of the allotments will take place annually. Monitoring will be used to determine the need for changes in numbers or duration of use due to reduced forage availability from drought or excess forage from above normal precipitation.

Decision Framework

Given the purpose and need, the District Ranger of the Houston/Rolla/Cedar Creek Ranger District is the Responsible Official for reviewing the Proposed Action, any other alternatives, and the environmental consequences in order to make the following decisions:

- Whether the proposed activities and alternatives are responsive to the issues, accomplish Forest Plan direction, and meet the purpose and need as defined for the Cedar Creek Range East project,
- Which actions or alternative to approve and implement,
- Whether the information in this analysis is sufficient to make an informed decision, and
- If the activities can be implemented in a timely manner.

If an action alternative is selected, the decision may include mitigation measures in addition to the Forest Plan Standards and Guidelines.

The decision is not one of land allocation, nor is the analysis intended to look at every possible combination of activities. The scope of the decision will be confined to a reasonable range of alternatives that will meet the projects' purpose and need.

Public Involvement

The project was initiated with the mailing of a joint Scoping/30-day comment letter to the Houston/Rolla/Cedar Creek District NEPA mailing list, Tribal contacts, bidders and permittee holders on March 6, 2012 (347 addresses). This project was uploaded to the Mark Twain National Forest Web site as of March 7, 2012. This uploading of joint scoping/30-day comment letter, vicinity map, treatment table, and comment form to the Mark Twain Web site also loaded project information to the quarterly forest-wide Schedule of Proposed Actions (SOPA). In this project the Responsible Official used the discretion given to them by 36 CFR 215.5(a)(2) in determining the most effective time for publishing the legal notice of the proposed action and opportunity to comment under 36 CFR 215.5 (b). The Scoping and 30 day comment period ran concurrently for this project since the nature of this project is low in complexity, is conducted routinely and the environmental effects are highly predictable.

Comments received during the scoping period were accepted and evaluated in the development of issues and alternatives to the proposed action. In the formal comment period (Legal Notice publication, 03-11-2012) the Houston/Rolla/Cedar Creek Ranger District received responses from 13 individuals and organizations. As of the deadline for receiving comments, close of business April 11, 2012, 10 comments were received. All 10 timely comments received were reviewed and evaluated by members of the Interdisciplinary Team (IDT) and the deciding official. The three remaining comments, received after April 11, 2012, were also reviewed by members of the IDT. No additional concerns were raised as a result of these three late comments. All comments are addressed in the Response to Comments located in Appendix D of this document. No comments in opposition have been brought to the attention of the IDT or the Deciding Official.

Mailing lists of all individuals and organizations that were notified during this project can be found in the Cedar Creek Range East project file.

Issues

In accordance with laws and regulations, factors such as vegetation, wildlife, threatened and endangered species, water and air quality and cultural resources will be addressed in the analysis. The IDT separated the issues into two groups: key issues and non-key issues. Key issues were defined as those that directly or indirectly generate/bring about a point of disagreement, debate or dispute over the proposed action based on environmental effects. Non-key issues were identified as those: 1) outside the scope of the proposed action; 2) already decided by law, regulation, Forest Plan, or other higher level decision; 3) irrelevant to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence. The Deciding Official reviewed and concurred with the key and non-key issues. The Council on Environmental Quality (CEQ) NEPA regulations explain this delineation in Sec. 1501.7, "...identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)..."

A: Key Issues Considered

The purpose of soliciting comments is to determine where there are any unresolved issues that affect a resource, the proposed action or another alternative. As stated in the previous section, only 13 comment letters, telephone comments, or e-mails to this project were received. Using the comments from the public, other agencies or tribes, and organizations, the interdisciplinary team determined that no "key issues" were identified from these comments. Since the public involvement process did not generate or identify any unresolved key issues over our proposed action identified on March 11, 2012, no additional alternatives were developed.

B: Non-key Issues Considered but already decided by law, regulation, Forest Plan, or other higher level decision

Non-key Issue: Discovery of Cultural Resources during Project Implementation: This project represents formal administrative reauthorization of historically ongoing range management activities. No new activities are being proposed that would have the potential to adversely affect historic properties, as defined by 36 CFR 800.5(b). Should additional activities be proposed at a future date that would have the potential to adversely affect historic properties with the Cedar Creek Range East project, regulatory consultation will be completed prior to implementation of those activities.

CHAPTER 2 – ALTERNATIVES CONSIDERED

Introduction

This chapter describes and compares alternatives to the proposed action considered in the Cedar Creek Range East project analysis. Information in this section will provide the decision maker with a range of alternatives to consider for the Cedar Creek Range East project. The process used to develop alternatives, the description of alternatives to be analyzed in further detail, a comparison of those alternatives, and the reasoning for eliminating other alternatives that were considered from further analysis will be explored in this section of the analysis.

Formulation of Alternatives

The Interdisciplinary Team (IDT) and District Ranger (Deciding Official) analyzed both internal and external comments received. Alternatives are developed to respond to the unresolved issues as they related to the purpose and need for this project, laws, regulations, and policies that govern land use on the National Forest System lands. The alternatives considered in detail; Alternative #1 (No Action), Alternative #2 (Proposed Action), display a range of options which meet the purpose and need for the project and could be used to implement the Cedar Creek Range East project. As stated in chapter one, the public involvement process did not generate or identify any unresolved key issues over our proposed action identified in our joint scoping/30-day comment letter mailed on March 6, 2012. As a result, no additional alternatives were developed.

Alternatives to the “proposed action” must meet the purpose and need for the Cedar Creek Range East project which was identified earlier. A “no action” alternative must be included as one of the alternatives analyzed.

Alternatives to be Evaluated in Detail

The Forest Service through Interdisciplinary Team input along with input and review of the deciding official and analysis of the issues developed two alternatives in detail, including the No Action and Proposed Action alternatives. After an alternative has been selected and as the project is implemented, actual amounts of activities on the ground (measured in acres or miles) may vary. All changes would be evaluated to ensure that any effects are within the parameters of effects analyzed in this document and would be documented in the Cedar Creek Range East project record.

Below are the two alternatives being carried forward in the Cedar Creek Range East project environmental analysis.

Alternative 1 – No Action

This alternative is the No Action Alternative required by Council on Environmental Quality (CEQ) and provides a baseline or reference point against which to describe environmental effects of the action alternatives. This is a viable alternative and responds to the concerns of those who

want no vegetation management activities (e.g. “Do not maintain the open lands”). The option for future management in this area would not be foreclosed.

If Alternative 1 is selected, current and on-going management activities would cease and no new federal management activities would be initiated. No mowing, prescribed fire, noxious weed control, or grazing would be used to maintain open lands at this time.

Changes, such as road maintenance, might occur through current management direction, natural processes, or other management decisions in the future.

Under this alternative, the following activities would continue to occur in the Cedar Creek Range East project area as part of the Forest Service’s responsibility to protect National Forest resources and public safety:

- 1) Resource protection
 - a) Suppress wildfires as they occur,
 - b) Remove hazard trees along roads as they occur,
 - c) Periodically maintain Forest System roads as safe public travel ways. The maintenance standard for this alternative is simply to keep roadways safe to travel.

The decision to implement Alternative 1 would have no effect on the continuation of these activities.

Alternative 2 – Proposed Action

This alternative is the proposed action based on the purpose and need outlined earlier in this document. This represents the interdisciplinary team’s proposal to move the existing resource condition toward the desired condition as specified in the 2005 Forest Plan.

Below is a summary of actions (identified in Chapter 1) that would occur in Alternative #2:

- This project would issue Grazing Permits and Allotment Management Plans (AMP). The AMP’s would implement an adaptive management approach (FSH 2209.13, Chapter 90) which will specify the maximum limits or parameters for the appropriate timing, intensity, frequency, and duration for grazing. Annual Operating Plans with permittees will be in place.
- Maintenance practices to include: mowing, hand-cutting, seeding, fertilizing, liming, mechanical treatments of non-native invasive plants, water source and fence maintenance. The above actions have been variously implemented within the previously existing, grazed, and maintained allotments, and constitute a continuation of ongoing activities; therefore, they are not anticipated to result in additional ground disturbance. (Note: Herbicide treatment of invasive species could also be utilized as a result of the Forestwide Integrated Non-native Invasive control decision made on 2-14-2012.)
- AMPs will comply with the 2005 Forest Plan and are designed to use cattle grazing to help meet wildlife objectives while minimizing impacts to other resources such as soil, water, and aquatics. There are no Threatened, Endangered or Sensitive species known to occur within the fields which are currently being grazed on HRCC.
- Monitoring of the allotments will take place annually. Monitoring will be used to determine the need for changes in numbers or duration of use due to reduced forage availability from drought or excess forage from above normal precipitation. See Table 1 on the next page for livestock numbers and season of use within the Cedar creek Range East project.

Table 1: 2012 Cedar Creek Allotments

Allotment Name	Number of pastures	Capable Grazing Acres	Livestock Number and Class (Animal Units-AU)		Season of Use/(Days)	Permitted Animal Unit Months (AUM's)
			Number	Class		
101	4	95	30	Cow/Calf	4/14 – 10/13(183)	207
102	4	226	70	Cow/Calf	4/14 – 10/13(183)	556
103	5	145	46	Cow/Calf	4/14 – 10/13(183)	365
104	4	138	44	Cow/Calf	4/14 – 10/13(183)	349
105	3	57	16	Cow/Calf	4/14 – 10/13(183)	127
106	1	36	12	Cow/Calf	4/14 – 10/13(183)	72
201	2	107	33	Cow/Calf	4/14 – 10/13(183)	262
202	5	176	35	Cow/Calf	4/14 – 10/13(183)	278
203	3	120	27	Cow/Calf	4/14 – 10/13(183)	214
204	3	117	20	Cow/Calf	7/1 – 8/15(46)	214
205	1	30	27	Cow/Calf	4/14 – 10/13(183)	30
301	1	25	17	Cow/Calf	5/15 – 8/31(109)	80
401	4	189	45	Cow/Calf	4/14 – 10/13(183)	357
501	3	116	30	Cow/Calf	4/14 – 10/13(183)	238
502	3	174	52	Cow/Calf	4/14 – 10/13(183)	413
503	3	147	40	Cow/Calf	4/14 – 10/13(183)	318
601	4	159	40	Cow/Calf	4/14 – 10/13(183)	318
701	2	48	12	Cow/Calf	4/14 – 10/13(183)	95
702	5	228	65	Cow/Calf	4/14 – 10/13(183)	516
801	3	119	41	Cow/Calf	4/14 – 10/13(183)	326
802	6	186	55	Cow/Calf	4/14 – 10/13(183)	437
901	6	268	60	Cow/Calf	4/14 – 10/13(183)	477
1001	5	202	60	Cow/Calf	4/14 – 10/13(183)	477
1901	6	206	54	Cow/Calf	4/14 – 10/13(183)	429
2001	1	24	37	Heifers inc. Bull	6/1 – 6/30(30)	48

* All treatment activity values listed above are given with approximate values.

Alternatives Considered but Eliminated from Detailed Study

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). Public comments provided suggestions and information pertaining to management of the allotments. The suggestions brought up issues, but did not propose any additional alternatives that weren't already being considered in detail. Some of the concerns were also outside of the scope of this decision.

Mitigation Common to All Action Alternatives

The following are mitigation measures that would be implemented in addition to the Forest Plan Standards and Guidelines. Mitigation measures identified by letters refer to the following:
CR – Cultural Resources

CR1: Discovery of Cultural Resources during Project Implementation

Although past cultural resources surveys are designed to locate all archaeological sites and site components that might be eligible for the National Register, such sites and site components may go undetected for a variety of reasons. Should any previously unrecorded cultural resources be discovered during continued project implementation, activities that may be affecting that resource will be halted immediately; the resource will be evaluated by a professional archaeologist; and consultation will be initiated with the State Historic Preservation Office (SHPO), as well as with the Advisory Council on Historic Preservation, if required, to determine appropriate actions for protecting the resource and for mitigating any adverse effects on the resource. Project activities at that locale will not be resumed until the resource is adequately protected and until agreed-upon mitigation measures are implemented with SHPO approval.

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL EFFECTS

Introduction

This chapter summarizes the physical and biological, social and economic environments of the affected project area and the cause and effect relationship of implementing each alternative on that environment. Resource specialists analyze the magnitude of direct, indirect, and cumulative effects of the proposed activities on both short and long term productivity. Only information necessary to understand the environmental consequences is included in this document. The project record contains all project specific information, including specialist reports and results of the public participation. The project record is located at the Rolla Ranger District Office. Information from the record is available upon request.

The following are definitions of terms used in discussing the environmental effects of proposed activities:

Affected environment (40 CFR 1502.15) is a brief description of the area(s) to be affected by the proposed activities. The description shall be no longer than is necessary to understand the effects of the alternatives.

Direct effects (40 CFR 1508.8) are those occurring at the same time and place as the triggering action (e.g. Current authorized livestock grazing on riparian areas).

Indirect effects (40 CFR 1508.8) are those caused by the action, but occur later, or at a distance from the triggering action (e.g. Sediment input into streams due to a loss of vegetative cover from grazing activities).

Cumulative effects (40 CFR 1508.7) are the effects on the environment that results from incremental effect of the action added to the effects of other past, present, and reasonably foreseeable future actions, regardless of whether or not the agency or person undertakes them and regardless of land ownership on which other actions occur. An individual action when considered alone may not have a significant effect, but when its effects are considered in addition to effects of other past, present, and reasonably foreseeable future actions, the effects may be significant (e.g. The effects of catastrophic wildfire on a grazing allotment and the watershed as a whole).

The cumulative effects analysis for each alternative is evaluated separately for each resource and may have different spatial and temporal boundaries. Agencies are not required to list or analyze the effects of individual past actions unless such information is necessary to describe the cumulative effect of all past actions combined. The analysis of cumulative effects begins with consideration of the direct and indirect effects on the environment that are expected or likely to result from the alternative proposals for agency action. Agencies then look for present effects of past actions that are, in the judgment of the agency, relevant and useful because they have a significant cause and effect relationship with the direct and indirect effects of the proposal for agency action and its alternatives.

The USDA Forest Service uses the best available science and most reliable and timely data available. Accuracy from the Geographical Information Systems (GIS), Natural Resource Information System (NRIS), Forest Service Activity Tracking System (FACTS), Rangeland

Infrastructures Database (INFRA) and other databases vary in accuracy. All attempts to verify and update this information have been made where possible.

Suitable rangelands are openlands of grasses or shrubs capable of producing forage for livestock. Range management by grazing or haying on the Mark Twain NF is currently done in warm and cool-season grass pastures and glades. Wildlife also use these pastures and glades for food and shelter.

Management of rangelands requires coordination with other resources and uses. Standards and guidelines have been designed to minimize impacts on soil, water, and other important resources while ensuring that desired structure and species composition of rangeland vegetation is moved toward or attained. Frequent monitoring of range allotments is important to ensure that use is occurring at expected levels and resource quality and function is not impaired.

Background

Before European settlement, great numbers of American bison, elk and white-tailed deer roamed freely throughout Missouri. The abundance of food, water, topography, predators, and seasonal migration behaviors were factors affecting the distribution of these native herbivores. These native grazers moved about the landscape and rarely revisited the same plant population during a growing season. Congregating around water sources might have led to localized grazing pressure, but the immense regional scale of high quality native vegetation buffered any lasting significant effects from this behavior. Prior to the introduction of modern exotic plant species, native plants repopulated areas impacted by local grazing pressure.

Following European settlement, humans greatly altered or eliminated bison, elk and deer populations and their grazing patterns through direct harvest or habitat destruction. By 1850, large scale commercial farming and livestock grazing had begun across the state. Large numbers of free ranging cattle, goats, sheep, hogs, and horses foraged across woodlands, savannas, glades, and forests, eventually stripping them of most of their abundant native grasses and wildflowers. This era of resource exploitation, coupled with extensive land clearing, resulted in soil loss and erosion that degraded watersheds and altered forage conditions across the Ozarks.

The lands in the Cedar Creek unit were all privately owned prior to 1937. Intensive cultivation of farm lands caused severe depletion and erosion of the fragile soils and this area became “land nobody wanted.” The USDA Soil Conservation Service acquired some of the land in the 1940’s and extensively reclaimed it. In the 1950’s the land was transferred to the USDA Forest Service for management. At this time erodible land had been planted to trees, fescue sod, and ponds created. Through cooperative management with the Cedar Creek Grazing Association, formed in the 1950’s with local cattle farmers, the Mark Twain National Forest have worked cooperatively to diversify the vegetation and maintain these lands through the use of livestock grazing. Many of these grazing allotments are now primarily cool-season pastures consisting of tall fescue, orchard grass, and other annuals and perennials.

Much of the Ozarks has now grown back in dense black and red oak forests that have little ground flora, and which have no suitable forage for livestock, and very little for wildlife. The exception was the Cedar Creek Unit, which has remained in openlands habitat management

throughout this time period. After establishment of the Mark Twain NF, range management began to reverse effects of decades of uncontrolled grazing. However, open range grazing was legal in Missouri until 1969; livestock and wildlife shared much of the Forest lands until that time. Recovery of watersheds, soils, and vegetation has progressed since then, but many watersheds still exhibit signs of degradation that can be traced back to overgrazing, over cutting, and other poor management practices that occurred before these lands became National Forest.

Most of the current range allotments on the Mark Twain NF are made up of purchased farms that were originally pastureland, cropland, glade, or open woodlands. Many of these allotments are now primarily cool-season pastures consisting of tall fescue, orchard grass, and other annuals and perennials.

As part of Forest Plan revision in 2005, an analysis of all Mark Twain NF lands was conducted to determine which lands are suitable for grazing and to determine which of these lands are appropriate for grazing. Only areas that are in an open condition (grasses and shrubs and without trees) are considered suitable. Glade, woodland, and riparian natural communities are excluded from lands appropriate for grazing due to concern for their ecological sustainability and ecosystem health. Riparian ecosystems are important habitat for many plant and animal species. The twenty five existing allotments being analyzed in this document are found to be outside the Riparian Management Zones (RMZ) identified in GIS.

Physical Environment

SOIL and WATER QUALITY

General discussion of soil disturbance

There are several mapping units which are located on the analysis area. Each of these mapping units has been evaluated according to eight different parameters. These parameters are given different ratings which will be referred to in later sections. The ratings are defined below.

Riparian soils –Riparian soils are those soil mapping units likely to experience flooding usually due to their position on the landscape and possible sedimentation. Riparian soil series are listed in the Mark Twain Forest Plan. In Table PF1 of the Cedar Creek Range East Project File, riparian soils are identified for each soil mapping unit as a yes (for riparian) or no (not riparian).

Wetland soils - Wetland soils are those soil mapping units containing soil series listed in the National and Missouri lists of hydric soils. Soils are one of the components used in delineation of jurisdictional wetlands. In Table PF1 of the Cedar Creek Range East Project File, wetland soils are identified for each soil mapping unit as a yes (for wetland) or no (not wetland).

Flooding frequency and duration – Flooding frequency is expressed (Table PF1 of the Cedar Creek Range East Project File) as none, rare, occasional, or frequent. None means that flooding is not probable; rare means that it is unlikely but possible under unusual weather conditions (chance of flooding is between zero and five percent in any year); occasional that it occurs infrequently under normal conditions (chance of flooding is between 5 – 50 percent in any year); and frequent if it occurs often under normal weather conditions (chance of flooding is more than 50 percent in any year). Duration is expressed (Table PF1 of the Cedar Creek Range East Project File) as very brief if less than two days, brief if two to seven days, long if seven days to a month, and very long if more than a month. This is based on evidence in the soil profile, local information, and the relation of the soils on the landscape to historic floods.

Forest productivity - Forest Productivity is classified (Table PF1 of the Cedar Creek Range East Project File) as low, medium, high, or non-commercial forest land according to cubic feet per acre per year possible in a fully-stocked, even-aged, un-managed stand. Non-commercial forest land (Non-CFL) produces less than 20 cubic feet/acre/year, low productivity denotes 20 – 49 cubic feet/acre/year, medium productivity denotes 50 – 84 cubic feet/acre/year, and high productivity denotes 85+ cubic feet/acre/year.

Erosion potential – Because soil is eroded off the surface horizon, erosion results in a loss of nutrients for forest productivity (Fisher & Binkley, 2000). It also results in a loss of biodiversity of thousands of species of soil organisms numbering in the millions of total organisms which are lost to the site where the erosion takes place (Pierzynski, Sims, Vance 2000). In addition, erosion also results in a loss of carbon which was sequestered in the surface horizon (Boyle, 2002). Erosion potential is rated according to risk of erosion on forestland where normal practices are used in managing and harvesting trees. A rating (Table PF1 of the Cedar Creek Range East Project File) of low indicates soil loss is not an

important concern; a medium rating indicates that some attention to soil loss is required; and a high rating indicates that intensive treatments (such as seeding and mulching disturbed areas, water bars, etc.) or special equipment and methods of operation are required to minimize erosion. Potential erosion hazard is primarily based on slope and erodability as well as on soil depth.

There are various prediction models for soil erosion and more specifically rill and sheet erosion. The Water Erosion Prediction Project Computer Model (WEPP) has recently been used to predict erosion levels from various land management activities. Use of the specifications in this EA would reduce all these erosion levels significantly and within Forest Plan standards and guidelines.

Soil compaction potential is rated according to the degree to which soil compaction restricts or prohibits tree growth and water infiltration. First, a rating (Table PF1 of the Cedar Creek Range East Project File) of low indicates little or no restriction on the type of equipment that can be used. Second, a rating of medium indicates the use of equipment is seasonally-limited, or that modified equipment (rubber-tired skidders rather than crawler-type tractors) are needed. Third, a rating of high indicates that special equipment is needed or that use of such equipment is severely restricted by unfavorable soil characteristics.

Potential of damage to soil from fire is rated according to the degree to which soil characteristics are reduced in productive capacity from fire. The ratings (Table PF1 of the Cedar Creek Range East Project File) of low, moderate, and high are made on the basis of texture, amount of coarse fragments, slope, and surface soil. Most of the soils associated with this proposal have a rating of low to moderate potential.

Existing condition of Soil and Water Quality

Soils are delineated throughout the project area and cumulative effects analysis area based on soil mapping units. These mapping units commonly indicate a single soil series, soil texture class, and slope class. Many soil mapping units are complexes including two or three soil series, texture class, and slope class for each unit. There are approximately 25 soil mapping units located on the project area. Approximately five of these mapping units are riparian soils and may experience flooding of varying frequency and duration. Three of these soil mapping units are classified as hydric (or wetland) soil. The soil mapping units are generally on areas of low forest productivity with a few areas of moderate to high productivity occurring mostly in floodplains near stream channels on the landform. No soil mapping units have a high erosion potential. Most of the soil mapping units have a high compaction potential and low to medium potential of damage to soil from fire. These soil mapping units and natural resource components are given in Table PF1 of the Cedar Creek Range East Project File.

Direct and indirect effects on Soil and Water Quality

Alternative 1: (No Action)

No new management activities would take place, nor any associated activities with the proposed action. Therefore, no management-related appreciable changes in productivity of the land would occur. Grazing would be removed from the project area which would result in a slight decrease in compaction and erosion due to cattle paths re-vegetating. However, mitigation measures and

adherence to BMP in the proposed action alternative would be expected to yield minimally greater if not identical effects.

Alternative 2:

Alternatives were evaluated to assess whether implementation of the proposed project would result in any detrimental or beneficial effects to the soil resource. Alternatives can be compared based on the relative effects of soil disturbance.

Soil surface disturbance is one of the effects of the activities proposed. Management activities associated with grazing treatments in Alternative 2 would cause some soil disturbance. Potential exists for soil compaction and surface erosion as a result of heavy equipment operation on sites where management activities would occur. Soil surface disturbance is a significant concern because it has an impact on soil quality and sustainability. The Standards and Guidelines (S&G) of the MTNF Forest Plan (FP) are designed to minimize the amount of disturbance from management activities. Assessment of proposed activities on specific sites would determine if the degree and extent of soil disturbance would cause appreciable change in soil properties to be considered detrimental to the long-term productivity of the land. Determination of effects is based on available research, the completed soil surveys for the Mark Twain National Forest, and professional judgment. Adherence to the FP, S&G, and site-specific mitigation measures that follow could be expected to result in no appreciable changes in the inherent long-term productivity of the land.

Soil erosion potential is rated as low to medium in all of the 87 pastures.

Five pastures [Compartment (C) 8: Pasture Number (P) 2, 3; (C) 2: (P) 12; (C) 19: (P) 1; (C) 7: (P) 3] or about five percent of the pastures scheduled for these treatments occur on areas which have riparian soils over a portion of the pastures. Adherence to best management practices (BMP) will minimize sedimentation.

Soil rutting and compaction are the main potentials for damage from the openland mowing treatments. Rutting occurs when heavy machinery is used on fine-grained soils that are wet. Rutting destroys the structure of the soil and reduces the size of soil pores, which reduces the rate at which water can infiltrate into the ground, causing more ponding of water on the soil surface. All of the pastures scheduled for these treatments occur on soils with high compaction potential. Soil rutting can be mitigated by restricting mechanical treatments to dry soils conditions or frozen ground. Mechanical treatments can cause compaction if heavy equipment is used on the same ground repeatedly, but treatments are generally not repeated more than once a year.

Grazing may contribute to soil compaction within grazing areas due to hoof pressure. Soil compaction is greater where cattle traffic is concentrated along travel routes and around watering areas. Travel routes and watering areas are a small amount of the total area, so soil compaction is not significant across the project area. Compaction is restricted to the upper levels of the soil A horizon and would be undetectable in the B and C horizons. If overgrazing is avoided, the damage to the average forest and soil is so small as to be safely disregarded. Reported measurements of erosion from grazed forest land east of the 100th meridian rarely exceed 1.0 T/A/Y (Patric & Helvey, 1986). None of the prescribed grazing allotments are within MTNF and HRCC delineated riparian management zones (RMZ). The RMZ in proximity of the project

areas have been fenced out from grazing at a minimum distance of 100 feet from the nearest streams to protect the water resource.

Openland maintenance via hand-cutting would not leave bare ground open to erosion and runoff. Biomass felled and left on the ground would further reduce whatever minimal erosion may occur during heavy precipitation periods. Over time breakdown of foliage and small branches would result in increased nutrient levels. Soil macro and micro-organism biodiversity would increase in number and functional groups.

The activities of seeding and application of soil amendments (lime and fertilizer) will not cause any appreciable ground disturbance. One concern in the use of fertilizers is the movement of excess or otherwise improperly applied fertilizer into streams and other bodies of water. Referred to as nonpoint source pollution, “one impact of nutrient loss from fields is nutrient enrichment or *eutrophication* of surface water” which leads to increased production of algae, reduced light penetration to deeper waters, less production of oxygen by these deep water plants, and ultimately decreased populations of aquatic organisms (Havlin, 2005). To avoid these negative environmental consequences, the application of fertilizers would be carried out by trained personnel, taking all necessary precautions such as utilization of application buffers near surface waters, monitoring weather conditions for drift and run-off potential, using the recommended rates of application, as well as following all other application guidelines.

Cumulative effects on Soil and Water Quality

Cumulative soil effects are the estimated additive changes in soil disturbance (principally soil erosion/sedimentation and soil compaction) that might occur from the existing conditions, implementing the proposed project, current activities within the analysis area, plus any foreseeable actions.

Components of cumulative effects:

Spatial boundary:

The project area considered for the Soil and Water resource are the National Forest System (NFS) lands within the Cedar Creek Unit proclamation boundary east of Cedar Creek. This includes the approximately 12,658 acres of National Forest System lands, of which 37% is currently grazed (4,712 ac.). This includes the approximately 12,658 acres of NFS lands, of which 37% is currently grazed (4,712 ac.). The areas considered for cumulative effects are the four 12-digit hydrologic unit codes (HUC) (total of approximately 130,665 acres), which include the project areas (See Soil and Water cumulative effects boundary map in Cedar Creek Range East Project File - Folder D). The project area (Forest Service acres) thus makes up approximately 31.7 percent of the cumulative effects analysis area. The 12-digit HUCs are as follows: 103001021003, 103001021004, 103001021401, and 103001021402. Watershed based cumulative effects (water quality, soils, etc.) are best addressed from analyses based on watershed or sub-watershed areas.

Temporal boundary:

The time frame considered is ten years for the following reasons:

- 1.) Ten-year time frames provide a significant basis for measuring change in soil disturbance due to soil erosion and soil compaction.

- 2.) Increases in soil erosion from project and associated activities usually return to pre-project levels within three to five years.
- 3.) Soil compaction effects are variable and there is no information as to the time length for compacted soil to return to pre-project conditions in Missouri or in the Ozarks. Some information from the southeast U.S. indicates ten years is the average time for restoration of compacted areas through natural processes. The source of this information is from a technical bulletin on the effect of heavy equipment on the physical properties of soils and long-term productivity done under the auspices of the National Council for Air and Stream Improvement (NCASI) (Miller, Colbert, & Morris 2004).

Past and present activities that may have an effect on Soil and Water:

On Forest Service lands, past activities include timber harvesting and associated road building, log landings, haul roads, wildfire suppression with the associated firelines, and wildlife openings, construction, and maintenance. The past activities of timber harvesting and wildlife openings on National Forest system lands have had no long-term negative impact on the soil productivity with the mitigation measures applied. There is minimal evidence of accelerated erosion in the uplands. Areas where there have been timber harvests in the past have re-vegetated and there is no bare soil exposed in the closed cutting units. There are a number of unclassified non-system roads that are present in some of the areas that could be used for temporary haul roads. This would reduce the amount of new roads needed and would reduce the amount of associated sediment movement. No appreciable long-term soil disturbance effects have been identified, primarily because of methods used and mitigation measures applied on federal lands.

Other projects within the Soil and Water cumulative effects boundary include the following:

National Forest land actions include:

Integrated Non-Native Invasive Plant control Project (Record of Decision (ROD), 2-14-2012): The main focus of this project is to treat non-native invasive plant infestations on the Mark Twain National Forest using an integrated combination of manual, mechanical, cultural, chemical, prescribed fire, and biological control treatment methods. See the Integrated Non-native Invasive Control Project EIS and ROD in the Cedar Creek Range East Project File, Folder E for additional project specifics.

White Cloud Natural Community Restoration (Decision Memo (DM), 6-6-2012): This decision included fuel reductions by thinning small-diameter timber, cedar removal, and prescribed fire activities to restore and maintain specialized prairie, savannah, and open woodland ecosystems found in Compartment 20. See the White Cloud Natural Community Restoration DM in the Cedar Creek Range East Project File, Folder E for additional project specifics.

Southwest (Decision Notice, 12-17-2009): The primary objective of this decision was to provide a wide variety of goods, uses, and services including wood products, other products, visual quality, developed and dispersed recreation opportunities, and habitat for a variety of terrestrial and aquatic wildlife, fish, and other biota. Activities included timber harvest, trail work, cedar removal, prescribed burning, invasive species treatments, and openland maintenance (including grazing). See the Southwest Project EA and Decision Notice in the Cedar Creek Range East Project File, Folder E for additional project specifics.

Middle River II (Decision Notice, 6-25-2004): Like the Southwest project the primary objective of the Middle River II project was to provide a wide variety of goods, uses, and services including wood products, other products, visual quality, developed and dispersed recreation opportunities, and habitat for a variety of terrestrial and aquatic wildlife, fish, and other biota. Activities included timber harvest, designate old growth, improve parking, close non-system roads, prescribed burning, invasive species treatments, and openland maintenance (including grazing). See the Middle River II Project EA and Decision Notice in the Cedar Creek Range East Project File, Folder E for additional project specifics.

Private land actions include:

On private lands past activities have included conversion of forested land to pastures, timber harvest, and road building. During the conversion process to pastures there was an increase in the sedimentation of streams and creeks and their tributaries. As common in central Missouri, most of the riparian areas and surrounding uplands of perennial streams within the project area occur on private lands. Where the landowners left an adequate woody corridor along the perennial streams, the stream banks along the creek appear fairly stable. Areas without an adequate woody corridor along the streams exhibit signs of accelerated bank erosion.

Past activities have also included coal mining in proximity and within the project area prior to public land designation. Acid drainage from abandoned coal mines can be a significant threat to water resources due to the effects of low pH, low alkalinity, and increased concentrations of metals such as aluminum, manganese, iron and zinc. Some of these abandoned coal mines drain into Cedar Creek, which caused a 14-mile section of the stream to be declared “lifeless” by the Forest Service in 1979. In 1982 the Missouri Department of Natural Resources Land Reclamation Program began improvement work within the Cedar Creek watershed. Passive treatment wetlands were constructed, streambanks were repaired, and barren soil was seeded with warm-season grasses. Alkalinity and pH increased over time indicating a reduction in acidic discharge into Cedar Creek. There were no extremely low pH or alkalinity measurements after the passive wetlands were installed and streambanks were repaired in December 2000 (Allert 2003).

Reasonably foreseeable actions:

Future actions on National Forest lands may include: No actions are planned on the Cedar Creek District in the Spatial and Temporal boundaries identified.

Future actions on Private lands may include: Private lands make up a majority of the analysis unit. Most private activities are expected to continue as in the past which include but are not limited to land clearing for new homes, subdivisions, and farms; dairy and beef operations; and timber harvest. Most private acres in the watershed cumulative effects analysis area are used for cropland and other agricultural activities.

Cumulative effects discussion:

Alternative 1:

In this alternative, grazing and openland maintenance activities would cease on National Forest lands within the project area resulting in the woody encroachment and soon thereafter the

disappearance of the openland areas. As the vegetative species composition of the areas changes, a subsequent alteration of the soils would occur. Grasses replaced by cedar would cause the pH values of the soils to decrease. Erosion levels may decrease slightly as compaction potential and the resulting surface run-off is reduced. However, as discussed in the Vegetative Communities section of this EA, the probability of desirable species re-vegetating the area is small.

Alternative 2:

Adherence to the Forest Plan Standards and Guidelines, mitigation measures in this Environmental Assessment, and strict Annual Operating Instruction administration would be critical in minimizing detrimental impacts to the watershed resources. This project area makes up approximately 31.7 percent of the cumulative effects analysis area. Activities from private and state lands can be expected to impact watershed conditions to a greater degree than the Cedar Creek Range East EA proposal.

The management activities proposed under this environmental analysis could result in some soil disturbance. This disturbance would be a result of the proposed actions. Using the Forest Plan Standards and Guidelines, there would be adequate filter or buffer strips to help filter any sediment through the forest floor before reaching drainages.

Losses of soil nutrient capital lost via erosion may be offset by precipitation and other atmospheric inputs occurring over time following the activities of the proposed action (Peterson, 1982) (Weaver and Brown, 1978) (Weaver and Jones, 1981). Erosion and the associated decomposition of soil organic matter is difficult to estimate because this pool of organic carbon in the process of erosion is highly variable and a “moving target.” Eroded organic material mineralizes to carbon dioxide, methane, and nitrous oxide at rates far in excess of the non-eroded counterparts due to loss of physical protection and the changes in environmental conditions caused by dislodgment and transport (Boyle, 2002).

Irreversible or irretrievable commitment on resources

None of the alternatives would have an irreversible or irretrievable commitment on this resource in the proposed Cedar Creek Range East project area.

Soil and Water summary: There would be no significant cumulative effects on the soil and water resource because of the limited nature and extent of the cumulative effects discussed above. This conclusion was reached after analyzing all of the above information regarding the past, present, and reasonably foreseeable future activities on all ownerships within the specified spatial and temporal boundaries.

Biological Environment

VEGETATION & RANGELAND MANAGEMENT

Existing condition of Vegetation and Rangeland Management

The Cedar Creek Unit of the Mark Twain National Forest lies within the Outer Ozark Border Subsection of the Ozark Highlands Section and the Claypan Till Plains Subsection of the Central Dissected Till Plains Section. The Atlas of Missouri Ecoregions (Nigh and Schroeder, 2002) was used in the preparation of this analysis document and has detailed descriptions of these Sections, Subsections and the three Landtype Associations that fall within the Cedar Creek Range East project.

The following is a summary of historic and current vegetation conditions from the Forest Plan FEIS Pages 3-7 to 3-10.

Biological systems of the Ozarks are human-influenced and fire-mediated. Pre-historic evidence shows Native Americans manipulated Missouri's vegetation with fire. Elk and bison kept woodlands open with frequent, low-intensity fires. The only heavily forested areas were found along major rivers and other areas not affected by the fire regime. Beginning in the late 1800's and early 1900's, this ecosystem and the processes that maintained it were severely disrupted. Effects of historical activities relevant to vegetation conditions within the project area include:

- Overgrazing by cattle, hogs, goats, horses, and sheep roaming about the state for over a century resulting in the depletion of grass and forb cover/diversity,
- Initial suppression of the original fire regime followed by annual burning to stimulate forage for free-ranging livestock,
- Conversion of timberlands and ecosystems to croplands, brush land and pasture.
- Encroachment by eastern red cedar into glades and open woodlands as a result of overgrazing,

The majority of the open and semi-open habitats associated with tallgrass prairie and savanna, which is the successional transition zone between prairies and forest, have been lost in the Cedar Creek Range East project area. The loss of these habitats is due to several factors. These include: removal of fire from the system, overuse of the land through intensive agricultural practices, introduction of non-native plant species, urban sprawl, etc. Many openland areas managed by the Forest Service in the Cedar Creek Range East project area have been managed with native grasses, rotational grazing, prescribed burning, and mowing in the past.

Openlands and rangeland habitat are important habitats for approximately 200 wildlife species. These areas provide a vegetative composition and structure that differs from predominately forested environments. These habitats are constantly declining due to plant succession (which is often the result of fire exclusion on the landscape) as well as the invasion of species such as cedar and non-native invasive species such as sericea lespedeza and multiflora rose in savannas, glades, rangeland pastures, and warm-season grass fields. There are 4,712 acres currently being maintained as openlands with a variety of management practices.

As mentioned within this document, grazing is utilized as a tool to maintain and manage the open and semi-open habitats in the Cedar Creek Range East project area. Along with treatments such as mowing and prescribed burning, grazing contributes to maintaining desired structure and species composition objectives (Forest Plan, 2-20). A managed grazing program contributes many other benefits among those: economic benefits to local landowners, minimizes the Forest Service expense of maintaining openings, controls the spread of noxious weeds and non-native invasive plants, illegal and resource-damaging ATV use in openlands is minimized, and provides edge effect for many wildlife species. Grazing within the Cedar Creek Range East project area is managed on a total of 4,712 acres. Currently these pastures are managed under 25 separate Allotments or Range Management Units (RMU's).

As stated earlier in chapter two and repeated here Table 1 (below) shows livestock numbers and season of use within the Cedar creek Range East project. The proposed project covers 25 different allotments that have the following composition:

Table 1: 2012 Cedar Creek Allotments						
Allotment Name - RMU	Number of pastures	Capable Grazing Acres	Livestock Number and Class (Animal Units-AU)		Season of Use/(Days)	Permitted Animal Unit Months (AUM's)
			Number	Class		
101	4	95	30	Cow/Calf	4/14 – 10/13(183)	207
102	4	226	70	Cow/Calf	4/14 – 10/13(183)	556
103	5	145	46	Cow/Calf	4/14 – 10/13(183)	365
104	4	138	44	Cow/Calf	4/14 – 10/13(183)	349
105	3	57	16	Cow/Calf	4/14 – 10/13(183)	127
106	1	36	12	Cow/Calf	4/14 – 10/13(183)	72
201	2	107	33	Cow/Calf	4/14 – 10/13(183)	262
202	5	176	35	Cow/Calf	4/14 – 10/13(183)	278
203	3	120	27	Cow/Calf	4/14 – 10/13(183)	214
204	3	117	20	Cow/Calf	7/1 – 8/15(46)	214
205	1	30	27	Cow/Calf	4/14 – 10/13(183)	30
301	1	25	17	Cow/Calf	5/15 – 8/31(109)	80
401	4	189	45	Cow/Calf	4/14 – 10/13(183)	357
501	3	116	30	Cow/Calf	4/14 – 10/13(183)	238
502	3	174	52	Cow/Calf	4/14 – 10/13(183)	413
503	3	147	40	Cow/Calf	4/14 – 10/13(183)	318
601	4	159	40	Cow/Calf	4/14 – 10/13(183)	318
701	2	48	12	Cow/Calf	4/14 – 10/13(183)	95
702	5	228	65	Cow/Calf	4/14 – 10/13(183)	516

Table 1: 2012 Cedar Creek Allotments

Allotment Name - RMU	Number of pastures	Capable Grazing Acres	Livestock Number and Class (Animal Units-AU)		Season of Use/(Days)	Permitted Animal Unit Months (AUM's)
			Number	Class		
801	3	119	41	Cow/Calf	4/14 – 10/13(183)	326
802	6	186	55	Cow/Calf	4/14 – 10/13(183)	437
901	6	268	60	Cow/Calf	4/14 – 10/13(183)	477
1001	5	202	60	Cow/Calf	4/14 – 10/13(183)	477
1901	6	206	54	Cow/Calf	4/14 – 10/13(183)	429
2001	1	24	37	Heifers inc. Bull	6/1 – 6/30(30)	48

* All treatment activity values listed above are given with approximate values.

See Table 3 in Appendix C for additional allotment acre breakdown. There is scattered cedar and oak throughout the open areas. Forested vegetation around these parcels is thick forest of varying ages. Red oak, post oak, eastern red cedar, hickories, and white oak are the dominant trees species.

The Cedar Creek Grazing Association works in conjunction with the Forest Service to manage the openlands since the 1950's. It represents over 50 local farmers and employs several individuals to work with the Forest Service. This crew helps mow hazardous fuel and invasive species, erosion control and pond projects, fence construction and maintenance, and native grass conversion.

On most of the allotments, the lands are grazed at less than full capacity. Grazing at less than full capacity is designed to mitigate for seasonable climatic variations such as temperature, amount and timing of precipitation, and drought regimes. Grazing at less than full capacity allows flexibility in management by: minimizing the need to reduce livestock numbers based on seasonal forage availability, such as reduced production of cool-season grasses through hot summer months; and allowing for long-term sustainability of the livestock operation, forage resource, the warm-season grass emphasis pastures, as well as invasive plant management. It also allows production of high quality open land habitat for wildlife.

Cool-season grass species such as tall fescue (*Festuca arundinacea*), orchardgrass (*Dactylis glomerata*), redtop (*Agrostis gigantea*), and Kentucky bluegrass (*Poa pratensis*) occur throughout the project area. Legumes such as red clover (*Trifolium pratense*), white clover (*Trifolium repens*), Kobe lespedeza (*Lepedeza striata*), Korean lespedeza (*Lepedeza stipulacea*) and sericea lespedeza (*Lepedeza cuneata*) are the dominant forbs in pastures managed for cool-season grasses. Plant composition within cool-season pastures on average is 55 to 60% Tall fescue, 10 to 15% Kentucky bluegrass, orchardgrass, and redtop, 25 to 35% legumes with the remainder of the herbaceous vegetation made up of other forbs such as Western ragweed (*Ambrosia psilostachya*), and Missouri goldenrod (*Solidago missouriensis*). Currently about 3,276 acres of the total 4,712 acres of open pasture within the Cedar Creek Range East project are in cool season management.

Warm-season and other native grasses and forbs are found primarily within warm-season emphasis pastures. However, scattered remnants of prairie grasses and forbs may be found throughout grazed as well as un-grazed portions of the Cedar Creek Range East project area. Native grass species within the project area may include: (warm-season) big bluestem (*Andropogon gerardii*), Indiangrass (*Sorghastrum nutans*), little bluestem (*Schizachyrium scoparium*), sideoats gramma (*Bouteloua curtipendula*), broomsedge bluestem (*Andropogon virginicus*), switchgrass (*Panicum virgatum*), Eastern gamagrass (*Tripsacum dactyloides*), prairie cordgrass (*Spartina pectinata*) and (cool-season) Canada wildrye (*Elymus canadensis*). Native forbs that are present within the open and semi-open portions of the project area include: Illinois bundleflower (*Desmanthus illinoensis*), compass plant (*Silphium laciniatum*), butterfly milkweed (*Asclepias tuberosa*), prairie blazing star (*Liatris pycnostachya*), and partridge pea (*Cassia fasciculata*). Currently about 1,436 acres of the total 4,712 acres of open pasture within the Cedar Creek Range East project are in warm season management.

Maintaining a diverse openland habitat structure benefits a variety of grassland birds such as grasshopper sparrow (*Ammodramus savannarum*), dickcissel (*Spiza americana*), loggerhead shrike (*Lanius ludovicianus*), and Northern bobwhite quail (*Colinus virginianus virginianus*) as mentioned in the Wildlife section of this document. Warm-season and cool-season pastures are currently managed to maximize plant species diversity as well as openland structural diversity (cover). Special emphasis is also given to maintaining interstitial spaces between grasses in warm-season (bunch grass) pastures and cool-season grass pastures (typically sod forming grasses) and providing for covey headquarters for bobwhite quail. Interstitial spaces between grasses allow ground-nesting birds to travel freely while foraging as well as providing for a diverse forb population.

Management for diverse herbaceous plant composition within grazed areas also is beneficial to livestock performance and production. Inter-seeding legumes within cool-season pastures and managed deferred rotational grazing of warm-season pastures aids in the dilution of the amount of tall fescue consumed. This reduces the effects of fescue toxicity (summer slump) in cattle. Fescue toxicity is caused by a fungal endophyte found within tissues of the fescue plant. Symptoms include poor weight gains, reduced conception rates, intolerance to heat, elevated body temperature and nervousness.

There are some small ponds scattered in the Cedar Creek Range East project area. Many of these ponds are located in active grazing allotments. Some of these have become clogged with vegetation and have silted in. Some ponds have trees that are growing on the edges of some of the pond dams and can lead to failure of the dams.

Direct and indirect effects on Vegetation and Rangeland Management

Alternative 1: (No Action)

Under Alternative 1 (no action), the project areas would be left undisturbed. There would be no vegetation treatments to maintain open lands. There would be no grazing on 25 allotments (4,712 acres). Without grazing, this alternative would allow openlands to close in with red cedar, blackberry, persimmon, and honey locust. Desirable trees/shrubs such as white oak, hickory, and pine are not as prolific and are hindered by tall fescue's allelopathic nature; undesirable species are not similarly inhibited. Their berries and fruit are readily eaten and transported by birds and larger wildlife. Consequently, these species would dominate the vegetative community. Eastern

red cedar would become the successful climax species because it lives longer than persimmon and honey locust. As these species dominate and increase in crown cover, ground vegetation thins and is replaced by leaf litter. Other shade tolerant woody species, such as green briar would increase in the understory. Eventually all ground vegetation would disappear. In a period of 15 years, openlands would be virtually gone. The end result would be an even more simplified ecosystem offering limited quality wildlife habitat and watershed protection. This alternative would not enhance or move allotments towards desirable vegetative conditions.

Alternative 2:

Grazing would continue on 25 grazing allotments. Activities in this alternative would maintain 4,712 acres of existing cool (3,276 ac.) and warm (1,436 ac.) season pastures. These pastures would be grazed using a rotational grazing system.

Maintenance of range infrastructure such as gates, fences, water developments, etc. would continue for the enhancement of rotational grazing and livestock distribution. Openlands would be maintained through mowing, hand-cutting, seeding, fertilizing, liming, and, mechanical treatments of native and non-native invasive plants (NNIP). Pastures would be maintained to provide quality forage that includes a variety of cool-season and warm-season grasses and forbs.

This alternative allows use of a variety of tools and management practices for the direct establishment and encouragement of desirable vegetation for all management as described in the Forest Plan and in the “Desired Condition” section of this document. Total restoration of all pastures would be difficult and potentially cost prohibitive, but use of this alternative would result in progress towards desired condition.

On the 4,712 acres of cool-season and warm-season pastures, grazing, mowing, legume establishment, and fertilization would keep the areas in an open condition managed for wildlife and grazing. Grazing is the most cost-effective management tool to keep fescue pastures productive for wildlife.

Grazing, followed by over-seeding of desirable legumes during late winter would increase the diversity of plant species. Fescue management requires careful attention to achieve desired results. Because fescue is extremely difficult to keep in a productive condition for wildlife, the long-term goal should be elimination of fescue and replacement with vegetation such as warm-season grass that is easier to manage and more productive for wildlife.

Use of mowing provides land managers increased capability to control woody plant and NNIP invasion. Eastern red cedar blackberry, persimmon, sericea lespedeza, and honey locust would be effectively controlled or contained by mowing.

- **Cumulative effects on Vegetation and Rangeland Management**

The environmental consequences of this proposal are not only based on whether openlands remain open or develop into forested habitat, but are also based on the level of biological diversity and species richness that would develop in each community. Both the grazed and forested vegetative structure can lack biodiversity. Both community types can lack species richness and, thereby lack the capability to support a functional ecosystem. In other words,

openlands can be kept open but also kept in a monoculture of introduced species through over-disturbance. Forested habitats can also be dominated by a single species, which causes a lack of diversity and a dysfunctional ecosystem. Whether in open or closed condition, biological diversity and species richness are required to meet desired conditions.

Components of cumulative effects:

Spatial boundary:

The cumulative effects Vegetation and Rangeland Management boundary is the Cedar Creek Unit proclamation boundary east of Cedar Creek. This includes the approximately 12,658 acres of National Forest System lands, of which 37% is currently grazed (4,712 ac.) and approximately 35,647 acres of private land /other lands. This boundary was chosen because it allows the best analysis of grazing activity on Federal and private lands.

Temporal boundary:

The temporal boundary was set to analyze 10 years prior to this decision, plus 10 years following this decision. This boundary was selected because 10 years is the normal management cycle and this is the extent the effects are measurable and meaningful.

Past and present activities that may have an effect on Vegetation and Rangeland Management:

Within the past 10 years activities on Forest Service System lands includes the removal of grazing from RMZ's, and fencing of water sources to meet the objectives of the 2005 Forest Plan Standards and Guidelines.

Other projects within the Vegetation and Rangeland Management cumulative effects boundary include the following:

National Forest land actions include:

Integrated Non-Native Invasive Plant control Project (Record of Decision (ROD), 2-14-2012): The main focus of this project is to treat non-native invasive plant infestations on the Mark Twain National Forest using an integrated combination of manual, mechanical, cultural, chemical, prescribed fire, and biological control treatment methods. See the Integrated Non-native Invasive Control Project EIS and ROD in the Cedar Creek Range East Project File, Folder E for additional project specifics.

White Cloud Natural Community Restoration (Decision Memo (DM), 6-6-2012): This decision included fuel reductions by thinning small-diameter timber, cedar removal, and prescribed fire activities to restore and maintain specialized prairie, savannah, and open woodland ecosystems found in Compartment 20. See the White Cloud Natural Community Restoration DM in the Cedar Creek Range East Project File, Folder E for additional project specifics.

Middle River II (Decision Notice, 6-25-2004): Like the Southwest project the primary objective of the Middle River II project was to provide a wide variety of goods, uses, and services including wood products, other products, visual quality, developed and dispersed recreation opportunities, and habitat for a variety of terrestrial and aquatic wildlife, fish, and other biota. Activities included timber harvest, designate old growth, improve parking, close

non-system roads, prescribed burning, invasive species treatments, and openland maintenance (including grazing). See the Middle River II Project EA and Decision Notice in the Cedar Creek Range East Project File, Folder E for additional project specifics.

Post activity monitoring has verified that the analyses were compliant with the designating NEPA documents and the effects were as displayed.

Private land actions include:

Past and present rangeland/openland management activities on private lands include, grazing, haying, mowing, herbicide and pesticide use, fertilization, and conversion of forested land for home construction. During the conversion process to pastures there was an increase in the sedimentation of streams and creeks and their tributaries. As common in the Ozark Highlands section and the Houston/Rolla/Cedar Creek Ranger District, most of the riparian areas and surrounding uplands of perennial streams of the project area occur on private lands. Where the landowners left an adequate woody corridor along the perennial streams, the stream banks along the creek appear fairly stable. Areas without an adequate woody corridor along the streams exhibit signs of accelerated bank erosion.

Other Federal or State Lands

No other Federal or State lands are within the identified rangeland/openland management spatial boundary.

Reasonably foreseeable actions:

Future actions on National Forest lands may include: No actions are planned on the Cedar Creek District in the Spatial and Temporal boundaries identified.

Future actions on Private lands may include: Private lands make up a majority of the analysis unit. Most private activities are expected to continue as in the past which include but are not limited to land clearing for new homes, subdivisions, and farms; dairy and beef operations; and timber harvest. Most private acres in the watershed cumulative effects analysis area are used for cropland and other agricultural activities.

Cumulative effects discussion:

Upon settlement, farming and raising livestock was the main staple of local populations. At the turn of the century, railroad expansion brought a demand for low quality timber for use in railroad ties. This led to extensive logging. Land was rapidly cleared with even steep hillsides and isolated areas cut. As the timber played out, drought became severe, the Depression and world war caused a great migration out of the area into cities. Land was sold back to the government to become part of the National Forest System. As steep side slopes were allowed to re-vegetate both on private and public land, fires were suppressed, which allowed much of these areas to develop into forest. Effective fire suppression starting in the 1930's, changed vegetation composition and structure. Open areas have closed in with oak and pine, open woodlands and savannas have developed dense understory vegetation, shortleaf pine regeneration has declined, there is competition from hardwood understory, and red cedar has invaded dry-mesic areas. Native grasses, sedges, and forbs began to die-out from accumulations of leaf litter and increase in canopy covers, which starved the plants of sunlight.

On private lands, moderate to gentle slopes were cleared and cattle management was being encouraged by federal agencies and universities to replace row crop farming. Consequently, this has led to the situation today of rolling to level private land cleared and managed as cool-season pasture and steep slopes left to timber production with little management. Those areas that are accessible are usually logged when trees reach marketable size. The most valuable trees are usually taken and follow up thinning is absent. Many steep areas are left as unmanaged and are developing old growth characteristics. On public lands, the forests were largely left to grow and develop. Most past harvesting was uneven-aged management and thinning through firewood cutting.

Land uses occurring on private land which are likely to continue into the future are home construction, grazing, and timber harvest for commercial and personal use. The ratio of forest to open fields on private land within the cumulative effects area boundary should not change significantly for the next ten years. The greatest potential for change would be subdivisions. Private land pastures in the cumulative effects area boundary are mainly on ridge tops and bottomlands. It is not likely that private landowners would allow these pastures to grow back into forest in the near future. Conversion of forest to pastures has been a common occurrence in the past, but none has been noted recently.

Conclusion for Alternatives 1 & 2

Whether openlands are maintained or left to develop into forested communities the result has little impact to the forest/openland ratio. However, Alternative 2 would provide greater vegetative diversity. Not only would pockets of openland offer diversity to the forested habitats, but also to the openlands found on private land. Alternative 1 would allow an increase in acres of eastern red cedar forests, which would not offer much diversity, and would only add to the already high amount of cedar forest in the area. Alternative 1 would end grazing on National Forest System Lands (NFS) which may not cause local farmers to go out of business or lead to further subdivisions of private land, but there would be a loss of income to local communities, as current and future permittees would have to reduce their cattle numbers to compensate for the lost pastures. Alternative 1 would not meet the Goal Statements of 2.1 Public Values and 2.7 Range Management stated in the 2005 Forest Plan.

PLANTS

The diversity of plant species has varied throughout Missouri for centuries. Prior to the European settlement of the area, fire played a major role in the area. The species existing at one point in time may be completely replaced by other species over time because of the constantly evolving and changing habitat (includes plant succession). Some of the factors which influence the type of plants in an area include (but are not limited to): climate, slope, aspect, type of soil, amount of sunlight, amount of nutrients, the amount and duration of available water, the presence and/or absence of fire, stage of succession (ex. early forest successional stage) and parent material.

Federally Threatened, Endangered and Proposed Plant Species that are known to occur on the Cedar Creek portion of the Houston/Rolla/Cedar Creek Ranger District.

The U.S. Fish and Wildlife Service species list dated 03/22/2012 was utilized. The U.S. Forest Service is legally required to provide protection to ensure survival of federally listed species. *See the Biological Assessment for Threatened, Endangered and Proposed species in the project file for additional information. While the Biological Assessment only addresses the preferred alternative, there is no difference between the effects on Threatened, Endangered and Proposed in both alternatives.*

Existing Condition of Threatened and Endangered and Proposed Plants

Running buffalo clover – *Trifolium stoloniferum* Running buffalo clover is a disturbance loving perennial plant that flowers in mid-April through June and fruits from May to July. If there is not some type of disturbance, disturbance-dependant species would disappear due to a loss of habitat. (USDI – *Trifolium stoloniferum* Recovery Plan 1989) It may have depended on large herbivores (bison and elk) to periodically disturb areas and create habitat, as well as disperse seeds. As Bison and elk were eliminated, vital habitat and means of seed dispersal were lost (page 55 MTNF BA).

“... a clover that was once widespread in the eastern half of the United States, which became nearly extinct, perhaps following the decimation of the North American Bison herds (*Trifolium stoloniferum*, running buffalo clover).” (Yatskievych 1999)

In the early 1990's there were three different experimental plantings of the Running buffalo clover on the Cedar Creek unit (Hickey 1992). However, none were in area where the Cedar Creek Range East project occurs.

Direct, indirect and cumulative effects on the Running buffalo clover

Since the experimental plantings did not occur in any of the fields in the Cedar Creek Range East project area, there would be no effects on this species.

Irreversible or irretrievable commitment on resources

None of the alternatives would have an irreversible or irretrievable commitment on this resource.

Regional Forester Sensitive Plant Species in the Cedar Creek Range East project area.

See the Biological Evaluation in the Project File for information regarding Regional Forester Sensitive Species.

State of Missouri Endangered Plant Species that are not documented to occur in the Cedar Creek Range East project area due to a lack of suitable habitat:

This includes the, Running Buffalo clover (*See the Federally Threatened, Endangered and Proposed Plant Species section for additional information*), Small whorled pogonia, Mead's Milkweed, Decurrent false aster, Missouri bladderpod, Geocarpon, Pondberry, Eastern Prairie fringed orchid Western Prairie fringed orchid and the Virginia sneezeweed. *Because these species and their habitat do not occur in the Cedar Creek Range East project area they will not be discussed any further in this document.*

Irreversible or irretrievable commitment on resources

None of the alternatives would have an irreversible or irretrievable commitment on this resource.

OLD GROWTH**Existing condition of old growth**

The main factors required to meet old growth characteristics include (1) large diameter trees (the size needed may vary because a tree's longevity varies by species), (2) evidence of large tree deterioration such as broken or dead tops and limbs, top and/or bottom rot, and cavities, (3) large standing snags and large logs on the ground. Old growth stands may vary due to such factors such as the age, ecological land type, a sites capability, the species composition and the sites history. However, the Cedar Creek Range East project area consists of old fields which consist primarily of tall fescue and/or warm season grasses. Thus no suitable old growth habitat is present in this project area.

Direct, indirect and cumulative effects on old growth**Items common to both alternatives**

Since the Cedar Creek Range East project is a formal administrative reauthorization of historically ongoing range management activities and the project areas (25 allotments) consists of tall fescue fields and warm season grass fields, there would be no effects on the old growth resource.

Irreversible or irretrievable commitment on resources

None of the alternatives would have an irreversible or irretrievable commitment on the old growth resource.

WILDLIFE

This wildlife write-up section includes information on mammals, birds, amphibians (includes salamanders), reptiles, mollusks, insects and crustacean and their habitat. This analysis is tiered to the Mark Twain National Forest – 2005 Land and Resource Management Plan Final Environmental Impact Statement and Record of Decision (9/2005)

Database, reference material and survey information

In partnership with Mark Twain National Forest and others, the Missouri Department of Conservation has been very aggressive in conducting species surveys and maintaining data on both listed and common species.

The Missouri Heritage Database not only includes specific locations of plant and animal species, but also includes occurrences of unique and/or rare natural communities. Many of these communities are suitable habitat for Federal Threatened and Endangered Species (T&E), and/or Regional Forester's Sensitive Species (RFSS). The Missouri Department of Conservation Heritage Survey database is where all occurrences of terrestrial and non-terrestrial species in Missouri are officially documented. This site can be accessed at:

<http://www.mdc.mo.gov/nathis/heritage/>.

The Missouri Department of Conservation maintains the Missouri Fish and Wildlife Information System database (MOFWIS). MOFWIS contains information on over 700 species that are found in the State of Missouri. This site can be accessed at:

<http://www.mdc.mo.gov/nathis/endangered/>. It includes information on T&E, RFSS, State of Missouri Endangered species, State of Missouri species of concern and other species. The information includes, but is not limited to a species documented sighting records, counties of occurrence, their life history, habitat requirements, effects (beneficial/adverse) from various activities and references.

The above two databases provide an up-to-date information source for numerous species. The Mark Twain National Forest contributes to and utilizes information from these databases.

Species' experts in Missouri have also been very aggressive in publishing reference material that includes specific species information such as their locations in the state and their habitat needs. The publications include: *Missouri Wildflowers*, *Missouri Orchids*, *Field Guide to Missouri Ferns*, *Walk Softly Upon the Earth (lichens and mosses)*, *Steyermark's Flora Of Missouri*, *Flora of Missouri, Volume 1*, *Butterflies and Moths of Missouri*, *The Crayfish of Missouri*, *The Fishes of Missouri*, *Naiades of Missouri*, *Birds of Missouri*, and *The Amphibians and Reptiles of Missouri*. These publications were utilized during the preparation of the following sections, including the evaluation of potential effects to the numerous species and/or their habitats in the Cedar Creek Range East project area.

The Mark Twain National Forest prepares the Wildlife, Fish, and Rare Plants (WFRP) Monitoring Report that includes information on trends of habitats, Management Indicator Species (MIS), and T&E species.

The Nature Conservancy maintains Element Stewardship Abstracts and Element Global Rankings that give specific information on species' locations, habitats, threats, propagation, life history, etc. This data sources was also consulted when analyzing potential effects of project implementation. The Nature Serve database can be accessed at <http://www.natureserve.org>.

Botanical surveys were conducted on the Houston/Rolla/Cedar Creek Districts during the 1990's by the Nature Conservancy.

Mist netting of bats was conducted on the Mark Twain National Forest in 1997, 1998, 1999, 2001 - 2012.

In addition to the extensive fieldwork done in preparation of the Missouri Heritage and MOFWIS databases and the publications, there are numerous field surveys conducted annually or as part of research projects in Missouri. The Mark Twain National Forest also has conducted surveys in partnership with others, or on its own. A sampling of these, include but are not limited to: Annual mid-winter eagle surveys, Forest bat surveys (cave, fall, summer, winter, mist-net, harp-trap, Anabat), Missouri Breeding Bird Atlas, Missouri Breeding Bird Survey Routes, Furbearer surveys, Cave Research Foundation Biological Inventories, Gardner and Gardner Cave Inventories, Botanical Surveys and Accipiter nest searches.

The information available on Threatened, Endangered, Proposed, and Sensitive (TES) Species locations and potential habitats in the Cedar Creek Range East project area is of sufficient quantity, quality, and relevance to make an accurate and complete analysis of potential effects on TES species in the Cedar Creek Range East project area. Enough information is available to make a reasoned management decision; therefore additional surveys are not needed for this project decision.

The diversity of wildlife species has varied throughout Missouri for centuries. Climate, geographic location, and the diversity of its landscape have all influenced the ecological communities that exist today. Prior to the European settlement of the area, fire played a major role in the area. The type of wildlife species present is related to the amount and type of vegetation that is present. The type of wildlife species present is constantly changing as succession continues. Therefore the species existing in an area may be completely replaced by other species over time because of the constantly evolving and changing habitat. No one single type of habitat or successional stage is best for all wildlife species, including TES and MIS.

Occurrence and distribution of a species depends on if there is suitable habitat in the area for that species. Some of the suitable factors include, but are not limited to: the type of existing vegetative cover, structure, an existing prey base, and their spatial distribution in the area.

Information on the occurrence and distribution of invertebrate species is lacking for Missouri. To our knowledge, there is no research currently being done on invertebrate species occurrence and/or distribution in Missouri. Because of the vast number of species, their small physical size, and the lack of on-going research it is unlikely that information would be available for the foreseeable future.

White Nose Syndrome is now located in Missouri, however it has not been found on the Mark Twain National Forest. The Cedar Creek Range East project area does not contain any caves or

known TES bat habitat. Therefore the White Nose Syndrome will not be discussed any further in this document.

Federally Threatened, Endangered and Proposed Wildlife Species that are known on the Houston/Rolla portion of the Houston/Rolla/Cedar Creek Ranger District.

The U.S. Fish and Wildlife Service species list dated 03/22/12 was utilized. The U.S. Forest Service is legally required to provide protection to ensure survival of federally listed species. *See the Biological Assessment for Threatened, Endangered and Proposed species in the project file for additional information. While the Biological Assessment only addresses the preferred alternative, there is no difference between the effects of both alternatives.*

Regional Forester Sensitive Wildlife Species

See the Biological Evaluation in the project file for information regarding Regional Forester Sensitive Species.

State of Missouri Endangered Wildlife Species

The March 1, 2012 State Endangered Species List (section 3CSR10-4.111 of the Wildlife Code of Missouri) was utilized in the preparation of this section. The Forest Service addresses all State of Missouri Endangered species. The only State of Missouri Endangered Species which may occur on the Cedar Creek unit include:

Gray bat and the Indiana bat: *See the Threatened, Endangered and Proposed wildlife species section.*

Bald eagle: *See the Regional Forester Sensitive Species section.*

Bachman's sparrow: *See the Management Indicator Species section.*

Existing condition of State of Missouri Endangered Species

Plains spotted skunk (*Spilogale putorius*)

The spotted skunk is not known to, but may occur in the Cedar Creek Range East project area. Its preferred habitat is fencerows, vegetated gullies and brush piles, snags, rocky outcrops, open prairies, and riparian woodland areas. Their dens are located below ground in grassy banks, rocky crevices or along fence rows as well as above ground in hay stacks, woodpiles, hollow logs or trees or brush piles. Mating takes place in late winter, and the young are born from April to June. Plains spotted skunks are nocturnal and omnivorous in nature; they will eat insects, mice, rats, some birds and vegetables.

Northern harrier (*Circus cyaneus*)

The Northern harrier is not known to, but may occur in the Cedar Creek Range East project area. The Northern Harrier is found in a variety of open areas (including wetlands or other moist areas). In Missouri, Northern harriers are a rare breeding species, arriving in March-April. They nest fairly late in the season (mid April to mid May) on dry ground in undisturbed marshes and prairies and pastures, or on elevated ground in low shrubby vegetation, tall weeds or reeds. They perch on the ground or on stumps or posts, and forage for small mammals, birds, large insects

(especially grasshoppers) snakes, lizards, toads, and frogs. This species prefers isolation from humans. It is also a winter resident of Missouri.

Black-tailed jackrabbit (*Lepus californicus*)

The Black-tailed jackrabbit is not known to, but may occur in the Cedar Creek Range East project area. In Missouri, they occupy pastures, hay fields and cultivated areas, especially before crops grow more than two feet tall. Jackrabbits breed year-round, although most breeding occurs from late winter to mid summer. Jackrabbits eat only vegetation. During summer they prefer herbaceous plants and grasses; the winter diet consists of dried grasses, buds, twigs, roots, and bark. Black-tailed jackrabbits need large expanses of grassland with open vistas.

Direct, indirect and cumulative effects on State of Missouri Endangered Wildlife Species

Plains spotted skunk

Alternative 1 (No Action):

The no action alternative, would not allow any management activities such as grazing or open land maintenance such as mowing to occur. This would result in the present openings reverting back to a cedar thicket and/or forested environment. This would have a negative effect on the plains spotted skunk and its habitat.

Alternative 2:

This alternative would allow grazing or open land maintenance such as mowing to continue. By being able to maintain present openings, this would result in a positive effect on the plains spotted skunk and its habitat.

Northern harrier

Items common to Alternative 1 and Alternative 2:

The Cedar Creek Range East project area is not isolated from humans.

Alternative 1 (No Action):

The no action alternative, would not allow any management activities such as grazing or open land maintenance such as mowing to occur. This would result in the present openings reverting back to a cedar thicket and/or forested environment. This would have a negative effect on the Northern harrier and its habitat. However, this alternative would reduce the amount of human activity in the area which would have a positive effect.

Alternative 2:

This alternative would allow grazing or open land maintenance such as mowing to continue. By being able to maintain present openings, this would result in a positive direct and indirect effect on the Northern harrier and its habitat. However, this alternative would maintain the present amount of human activity in the area.

Black-tailed jackrabbit

Alternative 1 (No Action):

The no action alternative, would not allow any management activities such as grazing or open land maintenance such as mowing to occur. This would result in the present openings reverting back to a cedar thicket and/or forested environment. This would have a negative effect on the black-tailed jackrabbit and its habitat.

Alternative 2:

This alternative would allow grazing or open land maintenance such as mowing to continue. By being able to maintain present openings, this would result in a positive effect on the black-tailed jackrabbit and its habitat.

State of Missouri Endangered Wildlife Species that do not have suitable habitat in Cedar Creek Range East project area.

This includes: Ozark big eared bat, ebony shell, interior least tern, peregrine falcon, Swainson's warbler, American burying beetle, fat pocketbook, pink mucket, snowy egret, elephant ear, mountain lion, Eastern massasauga, snuffbox, Higgins eye mussel, Curtis' pearlymussel, king rail, Eastern spotted skunk, Mississippi green water snake, Western fox snake, Blanding's turtle, Illinois mud turtle, Western chicken turtle, scaleshell sheepsnose, Eastern hellbender and the yellow mud turtle. *Note: Because these State endangered species and their habitat does not occur in the Cedar Creek Range East project area they will not be discussed any further in this document.*

Irreversible or irretrievable commitment on State of Missouri Endangered Wildlife Species resource.

None of the alternatives would have an irreversible or irretrievable commitment on this resource.

Neotropical Migrant Birds**Existing condition of Neotropical Migrant Birds**

There is some concern, that, populations of some Neotropical Migrant Bird (NTMB) species (some of which nest within the Forest boundaries) have been declining recently. Since many of these NTMB have various habitat requirements a general conclusion cannot be reached to explain the decline of all NTMB species. No one habitat type or successional stage is good for all NTMB species. A variety of habitat types is best.

In some cases a species decline may be due to a loss of wintering habitat in South America. Some of the decline may be attributable to the change in their North American habitat from factors such as urban sprawl, rural development and predation by non-native feral cats. (U.S. Fish and Wildlife Service, "Migratory Songbird Conservation" http://library.fws.gov/Bird_Publications/prob.html). Because the nearby communities of Fulton and Columbia, Missouri are expanding many people are moving into the area.

Nest predation is where cowbirds lay their eggs in the nests of other species, leaving the other species to raise their young, often at the expense of their own offspring. Brown-headed cowbirds have been linked to the decline in nesting success of many NTMB. Cowbirds prefer the edge

between forest and openings. These edge areas can include agricultural land and corridors from power lines.

In some areas where rural development is occurring, NTMB breeding habitat may be lost when land is being permanently cleared for home sites and lawns. Maintained lawns do not provide NTMB habitat.

Partners in Flight (PIF) has completed the Bird Conservation Plan for the Ozark/Ouachita - Physiographic Area 19 (PIF 2000) which includes the Cedar Creek Range East project area. Missouri has established a Neotropical Bird Working Group composed of experts from the Missouri Department of Conservation, Mark Twain National Forest, North Central Forest Experiment Station, and the University of Missouri. This Working Group is part of the National PIF effort and was created to evaluate threats to these species in Missouri and develop a list of species of concern for Missouri. The work of this group highlights the fact that breeding habitat for Neotropical Migrant Birds includes all successional stages and all types of habitat.

Direct and indirect effects on Neotropical Migrant Birds

Note: NTMB's utilize a wide variety of habitats. Therefore, it is not possible to draw a generalized conclusion, which would apply to all NTMB's. Cumulative effects are the same as the direct and indirect effects.

Alternative 1: (No Action)

The no action alternative, would not allow any management activities such as grazing or open land maintenance such as mowing to occur. This would result in the present openings reverting back to a Cedar thicket and/or forested environment. This would have a negative direct and indirect effect on species which require these openings. However it would have a positive effect on other species which do not utilize openings.

Alternative 2:

This alternative would allow grazing or open land maintenance such as mowing to continue. By being able to maintain present openings, this would result in a positive direct and indirect effect on effect on species which require these openings. However it would have a negative effect on other species which do not utilize openings.

Irreversible or irretrievable commitment on resources

None of the alternatives would have an irreversible or irretrievable commitment on the Neotropical Migrant Birds resource.

Management Indicator Species

Management Indicator Species (MIS) were selected in accordance with CFR 219.19. Various MIS were selected for the Mark Twain National Forest during forest planning for the 2005 Forest Plan. The selected MIS are resident species (yearlong or migrant) that are ecological indicators and are an indicator of management activities (both positive and negative).

The new MIS for the 2005 Mark Twain National Forest Plan include the: Northern bobwhite, Summer tanager, Bachman's sparrow, Worm-eating warbler and Red bat (2005 MTNF FEIS,

Table 15, page 3-116). The MIS are representatives for estimating the effects of forest management on populations of other species. The needs of these species range from open lands to old growth forests. Some of the species have very specific habitat requirements, while others are considered to be generalists that may utilize a range of habitats. Population monitoring information is displayed with each individual species.

In Missouri most of the species that require more open type habitats have declined slightly due to a loss in openings. Most of the species that require mature or old growth type habitat, have increased slightly as Missouri's forests continue to mature.

The amount of partially open land in Missouri continues to decline. The North Central Research Station's Forest Inventory and (NCFIA) Report of Missouri's Forests issued in 2003 states "Forested land area has increased steadily since a low point in 1972..." (2005 USDA Forest Service - Missouri's Forest Resources in 2003. North Central Research Station, Resource Bulletin NC-243).

Existing condition of the Northern Bobwhite:

The Northern bobwhite is usually found in prairies and native grasslands along the edge of forests. The Northern bobwhite is known to occur in the Cedar Creek Range East project area.

A lot of the adjoining private land includes fields (hay and row crop) and large lawns. A large portion of Forest lands are open fields which consist of Warm season or Cool season grass (Tall fescue). Warm season grass fields provide some good Northern Bobwhite habitat.

Note: Lawns do not provide Northern Bobwhite habitat. Some of the adjoining fields consist of Tall fescue fields, which do not provide Northern Bobwhite habitat either.

The Northern bobwhite forms tight coveys at night with everyone facing outward. This way they conserve heat at night and it is very difficult for predators to sneak up on a covey. They usually nest along the edge of woods or a field, in tall grass or brush piles. The primary nesting season for this bird is between March and September. **In Missouri, the Bobwhite quail numbers have declined 3.5 percent between 1980 and 2001.** This decline in the population is not surprising given that many other prairie and grassland species and their habitats are declining in Missouri and the Midwest.

Direct and indirect effects on the Northern Bobwhite:

Items common to both alternatives:

An effect is the conversion of woodlands and fields to homesites (on private lands) with their large lawns. This would continue to result in the loss of Northern Bobwhite habitat.

Alternative 1 (No Action):

The no action alternative, would not allow any management activities such as grazing or open land maintenance such as mowing or the hand cutting of Cedars or other trees to occur in the Warm season grass fields. This would result in the present openings reverting back to a Cedar thicket and/or forested environment. This would have a negative effect on the Northern Bobwhite and its habitat.

Alternative 2:

This alternative would allow grazing or open land maintenance such as mowing or the hand cutting of Cedars or other trees to continue in the Warm season grass fields. Being able to maintain openings, would result in a positive direct and indirect effect on the Northern Bobwhite and its habitat.

Irreversible or irretrievable commitment on resources

There would be no irreversible or irretrievable commitment on this resource in the Cedar Creek Range East project area.

Existing condition of the Summer tanager:

This solitary species is not known to occur in the Cedar Creek Range East project area, however it may occur in the Cedar Creek Range East project area. In Missouri this Neo-tropical migrant bird is usually found in deciduous forests, often near edges and gaps (i.e. Open Woodland). It utilizes bees and wasps as its primary prey. It mainly lays its eggs in May and June in trees between 3 and 11 meter off the ground. **In Missouri the Summer tanager numbers increased by 0.92 percent between 1996 and 2004.** In the Ozark-Ouachita Plateau they increased by 0.3 percent.

Direct and indirect effects on the Summer tanager:**Item common to both Alternatives:**

Neither alternative would impact the breeding habitat of the summer tanager.

Alternative 1 (No Action):

The no action alternative, would not allow any management activities such as grazing or open land maintenance such as mowing or the hand cutting of Cedars or other trees to occur. This would result in the present openings reverting back to a Cedar thicket and/or forested environment and would result in the loss of edge habitat which these species utilize. This could have a negative direct and indirect effect on the edge habitat that the summer tanager utilizes.

Alternative 2:

This alternative would allow grazing or open land maintenance such as mowing or the hand cutting of Cedars or other trees to continue. By being able to maintain present opening, this would result in a positive direct and indirect effect on the edge habitat that the summer tanager utilizes.

Irreversible or irretrievable commitment on resources

There would be no irreversible or irretrievable commitment on this resource in the Cedar Creek Range East project area.

Existing condition of the Bachman's sparrow:

This species is not documented to occur in the Cedar Creek Range East project area. Bachman's sparrows are usually found in open longleaf pine woodlands or grasslands. This includes areas which have been recently burned (Nature Serve 2006). The Bachman's sparrow is often found in areas where the red-cockaded woodpeckers are also found (Nature Serve 2006).

Note: There are no known red-cockaded woodpeckers on the MTNF. This ground nester breeds from late April till August and often raises two broods per year. They do not use an area if it was burned over 4 years previously. The Bachman's sparrow is extremely rare in Missouri. The Bachman's Sparrow is a Priority Bird Species for Pine Forests in the Partners in Flight Ozark-Ouachita Physiographic Region (www.partnersinflight.org/bcps/pl_19sum.htm 7/10/2010).

A more open habitat seems to be preferred by this species. "Bachman's Sparrows often prefer to walk (or run) rather than to fly" (Cox and Jones 2008). In Georgia "Almost every nest found (>90%) was located in an area which was burned within the past 12 months..." (Cox and Jones 2008)

Direct and indirect effects on the Bachman's sparrow:

Since there are no known Bachman's sparrow and/or Bachman's sparrow habitat in the Cedar Creek Range East project area, there would be no effects on this species.

Irreversible or irretrievable commitment on resources:

There would be no irreversible or irretrievable commitment on this resource in the proposed Cedar Creek Range East project area.

Existing condition of the Worm eating warbler:

This species is not known to occur in the Cedar Creek Range East project area or in the counties where the Cedar Creek Range East project area occurs. This forest interior species is usually found in large tracts (300-1000 ha) of upland hardwood forests and is a ground nester. This is a forest interior species. It usually nests between May and July. It appears to be tolerant of logging practices such as selective logging and thinnings after the activities have occurred. **In Missouri the Worm eating warbler numbers increased by 2.45 percent between 1996 and 2004.** In the Ozark-Ouachita Plateau they increased by 0.4 percent. The Worm-eating Warbler is a Priority Bird Species for Deciduous or mixed forest in the Partners in Flight Ozark-Ouachita Physiographic Region (www.partnersinflight.org/bcps/pl_19sum.htm 7/10/2010). There is one large tract of upland Forest within the Cedar Creek Range East project area. However, all the allotment fields are located along the edge of this large tract of upland hardwood forest adjacent to private lands which consist mainly of openings.

Direct and indirect effects on the worm eating warbler:

Items common to both alternatives:

Neither alternative would impact the above large tract of upland Forest.

Alternative 1 (No Action):

The no action alternative, would not allow any management activities such as grazing or open land maintenance such as mowing or the hand cutting of cedars or other trees to occur. This would result in the present openings reverting back to a cedar thicket and/or forested environment. After many decades this may have a positive direct and indirect effect on the Worm eating warbler and its habitat (in areas which are not surrounded by other openings).

Alternative 2:

This alternative would allow grazing or open land maintenance such as mowing or the hand cutting of Cedars or other trees to continue. By maintaining the present openings, this would not result in a positive direct and indirect effect on the worm eating warbler and its habitat (in areas which are not surrounded by other openings).

Irreversible or irretrievable commitment on resources

There would be no irreversible or irretrievable commitment on this resource in the Cedar Creek Range East project area.

Existing condition of the red bat:

Red bats are not known to, but may occur in the Cedar Creek Range East project area. This bat is usually found in a forested environment and it roosts in tree foliage usually 5 to 20 feet above the ground. The red bat is often a migratory bat (in some portions of Southern Missouri the red bat may be found year around). The exact status of red bats in Missouri is unknown (Personnel communication with Bill Elliott and Robbins in 2009).

Direct and indirect effects on the red bat:**Item common to both Alternatives:**

Neither alternative currently provides habitat for the red bat.

Alternative 1 (No Action):

The no action alternative, would not allow any management activities such as grazing or open land maintenance such as mowing or the hand cutting of cedars or other trees to occur. This would result in the present openings reverting back to a cedar thicket and/or forested environment. Eventually this may have a positive direct and indirect effect on the red bat and its habitat.

Alternative 2:

This alternative would allow grazing or open land maintenance such as mowing or the hand cutting of cedars or other trees to continue. By maintaining the present openings, this would not result in a positive direct and indirect effect on the red bat and its habitat.

Irreversible or irretrievable commitment on resources

There would be no irreversible or irretrievable commitment on this resource in the Cedar Creek Range East project area.

AMPHIBIANS

The Cedar Creek Range East project area consists of tall fescue or warm season grass fields. These fields do not provide amphibian habitat. There is some amphibian habitat by the adjacent ponds. There are some small man made ponds which supply drinking water for livestock and a few contain fish. The majority of these are fenced off and have livestock drinkers, however some of them are not fenced off.

FISHERIES AND AQUATICS

None of the Cedar Creek Range East project area contains any Streams, Creeks or Rivers. In addition they are not located with a Riparian Management Zone (RMZ). Therefore there would be no effect Streams, Creeks or River Water quality and Aquatics resulting from this project.

There are some small man made ponds which supply drinking water for livestock and a few of these contain fish. The majority of these ponds are fenced off and have livestock drinkers, however some do not.

Threatened, Endangered and Proposed Fish Species that may occur in the Cedar Creek Range East project area

See the Biological Assessment for Threatened, Endangered and Proposed species.

Regional Forester Sensitive Fish Species

See the Biological Evaluation for information regarding Regional Forester Sensitive Species.

State of Missouri Endangered Fish Species

The March 1, 2012 State Endangered species list (section 3CSR10-4.111 of the Wildlife Code of Missouri) was utilized in the preparation of this section. The Forest Service addresses all state of Missouri Endangered species.

Existing condition of State of Missouri Endangered Fish Species

There, are no documented State of Missouri Endangered Fish Species in the Cedar Creek Range East project area and they do not have suitable habitat in the Cedar Creek Range East project area. This includes the Topeka shiner, flathead chub, crystal darter, lake sturgeon, pallid sturgeon, Ozark cavefish, spring cavefish, goldstripe darter, harlequin darter, longnose darter, Niangua darter, redbfin darter, mountain madtom, Neosho madtom, cypress minnow, Sabine shiner, taillight shiner, central mudminnow and the swamp darter. Therefore there would be no effect on any of the State of Missouri Endangered Fish Species. *Because these species and their habitat, does not occur in the Cedar Creek Range East project area they will not be discussed any further in this document.*

Note: There are 25 separate allotments totaling approximately 4,712 acres (of open areas which may be actually grazed). These are spread out over the 69,501 acre (total acres within the purchase boundary) Cedar Creek unit. Establishing a NEPA cumulative effects boundary that would be measureable or meaningful would be difficult. In addition, no comments were received during the 30 day comment period that applied to cumulative effects. Therefore the cumulative effects are the same as the direct and indirect effects.

Natural Communities and Management Indicator Communities (MIC)

The 2005 Forest plan also has several natural communities which are found in Table 15, in the 2005 FEIS p.3-116. They include: Glades, Open Woodlands, Groundwater Seepage

Communities (such as fens, acid seeps). *Also see FEIS page 3 - 116 to 3 – 122 for additional information.*

Glades and Groundwater Seepage Communities

Direct and indirect effects on Glades and Groundwater Seepage Communities:

Since, no Glades or Groundwater Seepage Communities exist in the Cedar Creek Range East project area there would be no effects on these resources.

Irreversible or irretrievable commitment on resources

There would not be an irreversible or irretrievable commitment on these resources in the Cedar Creek Range East project area.

Open Woodland

There were some open woodlands in the Cedar Creek Range East project area, however they were converted to open fields decades ago. In addition, these unique habitats are disappearing on the Mark Twain National Forest due to natural succession and the absence of large fires on the landscape.

Direct and indirect effects on Open woodlands:

Items common to all alternatives:

Since, there are no Open Woodlands located within the Cedar Creek Range East project area, there would not be any (positive or negative) direct or indirect effect on Open Woodlands.

Irreversible or irretrievable commitment on resources

There would not be an irreversible or irretrievable commitment on this resource in the Cedar Creek Range East project area.

Social and Economic Environments

HERITAGE RESOURCES

Background/Overview

The Houston/Rolla/Cedar Creek (HRCC) Ranger District of the Mark Twain National Forest (MTNF) is proposing administrative reauthorization of ongoing livestock grazing in 25 previously existing, grazed, and maintained range allotments under the 2012 Cedar Creek Range East Project. The project area is located on 25 separate tracts of National Forest System lands totaling approximately 6,127 acres distributed throughout the Cedar Creek Unit. Each range allotment unit is subdivided into open pasture grazing areas, which in aggregate total approximately 4,712 acres.

Lands comprising the Cedar Creek Unit were privately owned prior to 1937. During the early 1940s, these lands were purchased by the U.S. Soil Conservation Service (now the Natural Resources Conservation Service), which transferred ownership to the U.S. Forest Service for administration and management in 1953. The 25 grazing allotments are currently on National Forest System lands and have been managed as a grazing resource since their acquisition. Although there are slight variations, a comparison of 1941 aerial photographs and the 2006 Digital Orthographic Quadrangles on file with the Mark Twain National Forest illustrates that a broad majority of the pasture openings currently in use had already been established prior to the early 1940s.

Pursuant to 36 CFR 800.5(b), the Mark Twain National Forest proposes that the 2012 Cedar Creek Range East Project represents formal administrative reauthorization of historically ongoing range management activities and will result in **no adverse effect** to existing heritage resources. No new activities are being proposed that would have the potential to adversely affect historic properties.

Previously Surveyed Areas: Although activities proposed for this project are limited to formal administrative reauthorization of historically ongoing range management activities and are expected to result in no adverse effect to existing heritage resources, previous cultural resources inventory surveys and previously recorded archaeological sites were considered for informational purposes. Fifteen broad-scale cultural resources inventory surveys have been performed within and adjacent to the Areas of Potential Effect for the 2012 Cedar Creek Range East Project as components of separate undertakings, and were implemented variously between 1978 and 2012 by MTNF heritage resources personnel and professional archaeologists under contract with the Mark Twain National Forest. A listing of reports documenting cultural resource surveys within or immediately proximate to the project area can be found in the 2012 Cedar Creek Range East Project File.

Should additional activities be proposed at a future date that would have the potential to adversely affect historic properties within the 2012 Cedar Creek Range East Project Area, cultural resources inventory survey and/or regulatory consultation will be completed prior to implementation of those activities.

Section 106 Consultation: Regulatory consultation with the Missouri State Historic Preservation Officer (SHPO) has been carried out for the activities proposed in the 2012 Cedar Creek Range East Project. Such consultation is required under the National Historic Preservation Act, as Amended (NHPA) and the accompanying regulations found at 36 CFR 800 with respect to the expected effects on cultural resources of the various actions proposed in the project alternatives. Formal consultation has been completed. A letter of concurrence was received from the Missouri State Historic Preservation Officer on 8/17/2012 that concurred with the cumulative effects analysis made with regard to project effects on historic properties, provided that project activities are implemented as proposed.

Existing condition of Heritage Resources

Archaeological Site Information: Prehistoric archaeological sites investigated to date in the 2012 Cedar Creek Range East Project Area indicate that the region saw widespread and occasionally locally intensive use by peoples during prehistory. Sites occur on a variety of landforms, and range in size and complexity from very small limited activity loci (incidental activity areas) represented by one or more artifacts, to more extensive camps/activity areas.

Archaeological investigations in the project area as well as information derived from archival sources have provided evidence of Euro-American agrarian land use and settlement that dates from the mid-nineteenth to the mid-twentieth centuries. The settlement period within the project area is bounded on the terminal end by the U. S. government's acquisition of local land tracts; however it is possible that such settlement was in decline prior to that time.

Specific information on both the historic and prehistoric sites previously recorded within the 2012 Cedar Creek Range East Project Area can be found in the Project File. The Archaeological Site Inventory Forms (on file with the Mark Twain National Forest and Missouri SHPO) provide more detailed descriptions of the archaeological sites.

National Register of Historic Places Significance: With certain exceptions (as discussed in the sections below, *Eligible Sites* and *Ineligible Sites*), past investigations of the 83 archaeological sites identified within and adjacent to the 2012 Cedar Creek Range East Project Area to date have been insufficient to fully and credibly evaluate them with respect to National Register of Historic Places Significance Criteria, as found in 36 CFR 60. The Mark Twain National Forest is therefore managing 54 (65%) of these sites as **unevaluated** properties that have the potential to meet one or both of principally two NRHP Significance Criteria (reference 36 CR 60.4), as being:

...properties that are associated with events that have made a significant contribution to the broad pattern of our history (Criterion A);

and/or

...properties that have yielded, or may be likely to yield, information important in prehistory or history (Criterion D).

Unevaluated archaeological sites are afforded protection from project activities that may adversely impact them just as eligible sites are protected, and effects to those sites would need to

be considered and regulatory consultation completed prior to the implementation of new activities should they be proposed at a future date.

Eligible Sites

Two sites within the 2012 Cedar Creek Range East Project Area have been determined to be **eligible** for listing on the National Register of Historic Places (NRHP):

FS Site No. 09050800109 (23CY497) is comprised of the remains of the Robert Newsom farmstead, a site significant to local history due to the events surrounding Robert Newsom's death. Allegedly, Newsom was killed by one of his slaves, a 19 year-old woman named Celia, in retaliation for prolonged abuse; Celia was tried and convicted of his murder in 1855, and subsequently hanged. Several artifact scatters and subsurface features have been identified at the site, which is considered eligible for the NRHP under Significance Criteria A and D [36 CFR 60.4(a)(d)].

FS Site No. 09050800093 (23CY477) consists of the remnants of the Caldwell Pottery, a stoneware producer established during the mid-19th century. The remains of the kiln stand ca. 2 ft. in height and measure ca. 11 ft. in diameter; hundreds of ceramic sherds are present in and around the kiln, to include examples of "redware, yellowware, and general stoneware." The site is considered eligible for the NRHP under Significance Criteria D [36 CFR 60.4(d)].

Ineligible Sites

Twenty-seven (33%) of the archaeological sites identified within the 2012 Cedar Creek Range East Project Area have previously been determined to be **not eligible** for inclusion on the National Register of Historic Places. These sites include 18 prehistoric period sites and 9 historic period sites. Ineligible sites currently identified within the project area consist of:

(Prehistoric)

- (2) lithic debris scatters/primary reduction areas of limited scope whose data producing potential has been exhausted through recordation;
- (16) lithic debris scatters of limited scope whose data producing potential has been exhausted through recordation;

(Historic)

- (6) rural homesteads/farmsteads with very few or no structural remains and no significant subsurface archaeological deposits; their data producing potential has been exhausted through recordation;
- (2) unidentifiable historic structure locations lacking structural integrity and significant subsurface archaeological deposits, their data producing potential has been exhausted through recordation;
- (1) road segment in poor repair lacking significant associated features, archaeological deposits, or historical significance; its data producing potential has been exhausted through recordation.

Definition of Effects and Area of Potential Effects

An Effect to a cultural resource is defined as "...alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register." [36 CFR 800.16(i)]. An Adverse Effect is found "when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association." [36 CFR 800.5(a)(1); see also subsection (a)(2)]. Effects to cultural resources may be either Direct or Indirect.

The Area of Potential Effect (APE) is defined as "...the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties.... The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking." [36 CFR 800.16(d)].

Direct and Indirect Effects on Heritage Resources

Direct Effects: With respect to the 2012 Cedar Creek Range East Project, proposed actions represent formal administrative reauthorization of historically ongoing range management activities. No new activities are being proposed that would have the potential to adversely affect historic properties, as defined by 36 CFR 800.5(1). Should additional activities be proposed at a future date that would have the potential to adversely affect historic properties within the project area, cultural resources inventory survey (if necessary) and regulatory consultation will be completed prior to implementation of those activities. Additionally, monitoring of the allotments by Mark Twain National Forest personnel will occur on an annual basis, at a minimum.

The activities proposed in this project are not expected to adversely affect cultural resources, and therefore are not considered to be undertakings for purposes of this project; they include the following:

- Continuation of ongoing grazing within previously cleared and plowed/tilled range allotments;
- Allotment mowing;
- Cutting and removal of encroaching vegetation;
- Allotment seeding, fertilizing, and liming;
- Non-ground disturbing mechanical treatments of non-native invasive plants;
- Maintenance of existing constructed water sources;
- Maintenance of existing fence lines.

Indirect effects: In general, reauthorization and proper implementation of historically ongoing range management activities of the kind proposed for the 2012 Cedar Creek Range East Project are not expected to result in indirect adverse effects to historic properties within the project area.

Analysis of Effects by Alternative

Comparison methods The parameters listed below guide the discussion of the expected effects on archaeological sites resulting from the proposed action. Effects on cultural resources are

based primarily on the presence of archaeological sites within the Area of Potential Effects that could be affected by the proposed activities.

Parameters

1. Only those activities proposed in the various alternatives that are defined as “undertakings,” as listed above in *Definition of Effects and Area of Potential Effects*, are used in this analysis;
2. The sites considered in this analysis include **only** those sites that are considered **unevaluated** or **eligible** with respect to National Register significance.

Alternative 1: (No Action) Abandonment of historically ongoing grazed, maintained, and monitored range allotments has some potential to lead to adverse effects to heritage resources through various mechanisms. These include – but are not limited to – a relatively rapid increase in hazardous fuels that, if burned unchecked, could lead to denudation and erosion of soil matrices and/or physical alteration of archaeological site components; the establishment of unauthorized user-created trails and/or roads in open, unfenced pasturelands, which could result in significant ground disturbance in areas containing historic properties; and the encroachment of non-native invasive species that, if given an opportunity to become established, could require ground disturbing methods of eradication at a future date.

Alternative 2: Proposed Action Formal administrative reauthorization of historically ongoing range management activities under the 2012 Cedar Creek Range East Project are not expected to result in adverse effects to previously recorded heritage resources within the Areas of Potential Effect. Effects to cultural resources resulting from the proposed activities listed above (see *Direct and Indirect Effects on Heritage Resources*) will be as follows:

- (1) In those project areas where no historic properties (archaeological sites meeting National Register criteria) are present, the proposed project activities have **no potential to affect** cultural resources.
- (2) In the case of **not eligible** sites, project activities are expected to have **no effect**.
- (3) In the case of **eligible** or **unevaluated** sites occurring in areas where no activities are proposed, project implementation is expected to result in a finding of **no effect** to cultural resources.
- (4) In those project areas where historic properties are present and where implementation of historically ongoing activities is proposed, such activities are expected to result in a finding of **No Adverse Effect** [36 CFR 800.5(b)] on cultural resources.

Cumulative effects on Heritage Resources

Because there are not expected to be any adverse effects to historic properties as a result of any of the activities proposed in the 2012 Cedar Creek Range East Project, there are not expected to be any cumulative adverse effects to cultural resources.

CHAPTER 4 - PROJECT COORDINATION AND MONITORING

Table 2: Preparers and Contributors

Interdisciplinary Team Members			
Name	Expertise	Professional Discipline	Natural Resource Experience
Mark Hamel	NEPA	B.S. Forestry University of Wisconsin Madison, WI	28 years
Klaus Leidenfrost	Wildlife Management	B.S. Wildlife Science Purdue University W. Lafayette, IN	34 years
Langston Simmons	Soils Resources	B.S. Agricultural Sciences–Soils Tennessee State University Nashville, TN	7 years
James Halpern	Heritage Resources	BFA/BA. Anthropology Florida State University Tallahassee, FL	20years
Steve Herndon	Range, NNIS	B.S. Agriculture - Natural Resource Management Lincoln University Jefferson City, MO	20 years

Agencies Consulted:

US Fish and Wildlife Service, Columbia, MO

State Historic Preservation Office, Missouri Department of Natural Resources, Jefferson City, MO

Missouri Department of Conservation, Wildlife Division, Columbia, MO

Missouri Department of Natural Resources, Jefferson City, MO

CEDAR CREEK RANGE EAST PROJECT MONITORING

Project level monitoring is designed to determine whether or not the resource management objectives of the EA have been implemented as specified and whether or not the measures were effective. These help determine if management activities are meeting the direction of the Forest Plan. Monitoring and evaluation help improve management and planning decisions.

Monitoring would be conducted by District Resource Staff on a sample of sites within the project area on an annual basis.

Soil/Water Monitoring:

Evaluation of effects from implemented activities on the soil and water resource will compare results to Regional threshold values (FSM2500) for detrimental disturbance.

Wildlife Monitoring:

Monitor population levels in cooperation with other agencies.

Non-native and Invasive Weed Monitoring:

Non native invasive plant surveys would document locations of invasive plants and where treatments have occurred. Surveys would be updated on an annual basis to monitor the effectiveness of various control measures and possible new infestations.

Transportation

Monitoring of the permanent transportation system would occur to identify future needs and closures.

Appendices

Appendix A: Glossary

Appendix B: References

**Appendix C: Cedar Creek Range East Project Activity Table
(Table 3) and Project Maps**

Appendix D: Response to Comment

Appendix A - Glossary of Terms Used	
A	
activity	Actions, measures, or treatments that are undertaken which directly or indirectly produce, enhance, or maintain forest and rangeland outputs or achieve administrative or environmental quality objectives, such as recreation.
Advisory Council on Historic Preservation	An independent Federal agency, established under the National Historic Preservation Act of 1966 (NHPA), as amended, to advise the President and Congress on historic preservation matters, to review Federal agency historic preservation programs and policies, to provide and encourage education and training on historic preservation, and to carry out reviews of Federal agency undertakings under Section 106 of the NHPA.
affected environment	The natural and physical environment and the relationship of people to that environment that will or may be changed by actions proposed.
animal unit (AU).	Defines forage consumption on the basis of one standard mature 1,000-pound cow, either dry or with calf up to 6 months old; all other classes and kinds of animals can be related to this standard, e.g. a bull equals 1.25 AU, a yearling steer equals 0.6 AU.
animal unit month (AUM).	The amount (780 pounds) of air-dry forage calculated to meet one animal unit's requirement for one animal unit for one month.
Archaeological Resources Protection Act (ARPA)	Public Law 96-95, 16 USC 470a, passed in 1979, required a permit for any excavation or removal of archaeological resources from public or Indian lands. Excavations must be undertaken for the purpose of furthering archaeological knowledge in the public interest, and resources removed remain the property of the United States.
B	
biodiversity	Variety of life and its ecological processes; the variety of organisms belonging to the same species, through arrays of genera, families, and higher taxonomic levels. Includes the variety of ecosystems, which comprise both natural communities of organisms within particular habitats, and physical conditions under which they live.
Biological Assessment (ESA species)	A "biological evaluation" conducted for major Federal construction projects requiring an environmental impact statement, in accordance with legal requirements under section 7 of the Endangered Species Act (16 U.S.C. 1536(c)). The purpose of the assessment and the resulting document is to determine whether the proposed action is likely to affect an endangered, threatened, or proposed species.
Biological Evaluation (Forest Service Sensitive Species)	A documented Forest Service review of Forest Service programs or activities in sufficient detail to determine how an action or proposed action may affect any threatened, proposed, or sensitive species.
Biological Opinion (BO)	An official report by the Fish and Wildlife Service (FWS) issued in response to a formal Forest Service request for consultation or conference. It states whether an action is likely to result in jeopardy to a species or adverse modification of its critical habitat.
C	
canopy	The vegetative cover formed collectively by the crowns of adjacent trees and other woody growth.
capability	The potential of an area of land to produce resources, supply goods and services, and allow resource uses under an assumed set of management

Appendix A - Glossary of Terms Used	
	practices and at a given level of management intensity.
cavity trees	Trees exhibiting hollows large enough to provide shelter for wildlife usage.
compaction	In soil, the process by which soil particles are rearranged to decrease void space and bring them in closer contact with each other, thereby reducing available water capacity, aeration, and porosity and increasing bulk density.
cool-season plant	A plant that generally makes the major portion of its growth during the winter, and early spring.
cumulative effect (NEPA)	The impact on the environment which results from the incremental impact of the action when added to other past present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.
cumulative effect (ESA)	Those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation. <i>NOTE: This definition applies only to section 7 analyses and should not be confused with the broader use of this term in the National Environmental Policy Act or other environmental laws. In addition the ESA cumulative effects spatial boundary may be different then the NEPA cumulative effects spatial boundary.</i>
D	
deferred rotation	This system involves at least two pastures with one not grazed (deferred) until after seed-set. This system provides opportunity for grasses to achieve maximum growth and seed production during the critical growing season on the deferred area.
direct effects	Effects that are caused by the action and occur at the same time and place.
E	
ecological landtype (ELT)	An area of land with a distinct combination of natural, physical, chemical, and biological properties that cause it to respond in a predictable and relatively uniform manner to the application of given management practices. In a relatively undisturbed state and/or at a given stage (sere) of plant succession, an ELT is usually occupied by a predictable and relatively uniform plant community. Typical size generally ranges from about ten to a few hundred acres.
Ecosystem	A community of living plants, animals, and other organisms interacting with each other and with their physical environment.
endangered species (E)	Any species which is in danger of extinction throughout all or a significant portion of its range and which has been designated as endangered in the FEDERAL REGISTER under the Endangered Species Act (ESA).
environmental analysis	The process associated with preparing documents such as environmental assessments and environmental impact statements and the decision whether to prepare an environmental impact statement. It is an analysis of alternative actions and their predictable short-term and long-term effects, which include physical, biological, economic, and social factors and their interactions.
Environmental Assessment (EA)	A concise public document that serves to: 1) briefly provide evidence and analysis for determining whether to prepare an EIS or a Finding of No Significant Impact; and 2) aid in an agency's compliance with the National Environmental Policy Act when no environmental impact statement is necessary (40 CFR 1508.9a).

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environmental effect	Net change (good or bad) in the physical, biological, social, or economic components of the environment resulting from human actions.
environment impact statement (EIS)	A statement of environmental effects required for major Federal actions under Section 102 of the National Environmental Policy Act of 1969 (NEPA), and released to the public and other agencies for comment and review. It is a formal document that must follow the requirements of NEPA, the Council on Environmental Quality guidelines, and directives of the agency.
F	
floodplain	Lowland and relatively flat areas adjoining inland and coastal water including flood prone areas of off-shore islands, including as a minimum, that area subject to a one percent or greater chance of flooding in any given year. The base floodplain shall be used to designate the 100-year floodplain (one percent chance floodplain). The critical action floodplain is defined as the 500-year floodplain (0.2 percent chance floodplain).
forage	Browse and herbage that are available for food for grazing animals or be harvested for feeding. Forage production. The weight of forage that is produced within a designated period of time on a given area (e.g. pounds per acre).
forbs	Any herbaceous plant other than a grass.
forest	A natural community in which 90 to 100 percent of the landscape is covered in trees, and often contains multiple subcanopy layers, shrubs, ferns, and ephemeral herbs. Forests are found in protected valleys, ravines, bluff bases, lower north-facing slopes, and fire shadow areas.
Forest Plan (Land and Resource Management Plan)	A forest plan (land and resource management plan) guides all natural resource management activity and establishes management standards and guidelines for a National Forest, embodying the provisions of the National Forest Management Act of 1976.
Forest Service Handbook (FSH)	Handbooks are directives that provide detailed instructions on how to proceed with a specialized phase of a program or activity. Handbooks are usually based on a part of the manual or incorporate external directives.
Forest Service Manual (FSM)	The manual contains legal authorities, objectives, policies, responsibilities, delegations, and instructions needed on a continuing basis by Forest Service line officers and primary staff in more than one unit to plan and execute assigned programs and activities.
G	
glade	A predominantly rocky, shallow-soil barren area dominated by an herbaceous layer of grasses, sedges, and herbs and with sparse woody vegetation. Eastern red cedar often invades many glades as a result of past or current overgrazing and fire suppression.
grass	A plant with long, narrow leaves having parallel veins and nondescript flowers. Stems are hollow or pithy in cross-section.
Grazing system	Grazing management that defines the periods of grazing and non-grazing.
H	
habitat	The place where animals live. It can be water for beaver, fish, and aquatic insects; caves for bats; or forested areas for many mammals, birds, and reptiles.
hardwood	A broad-leaved flowering tree that drops its leaves annually, as distinguished from a conifer.
Heritage Resource	The physical remains (artifacts, ruins, burial mounds, petroglyphs, etc.) or

Appendix A - Glossary of Terms Used	
	conceptual context (as a setting for historic or prehistoric events, etc.) of an area that gives insight into the lives of earlier man.
I	
indirect effects	Those effects that are caused by or will result from the proposed action and later in time, but are still reasonably certain to occur.
Interdisciplinary Team (IDT)	A group representing several disciplines used for regional and forest planning to insure coordinated planning of the various resources. Through interactions among its members, knowledge of the physical, biological, economic and social sciences, and the environmental design arts shall be integrated in the planning process.
invasive species	Species that are aggressive and tend to out-compete species native to an area or region. Normally, invasive species are also non-native or exotic, but can be native species that are off-site.
L	
landtype association (LTA)	These are recurring areas of land approximately 5,000 to 100,000 acres, fairly uniform in land surface form, subsurface geological materials, patterns of soils, and potential natural vegetation. Each LTA exhibits a unique pattern of ecological landtypes (ELTs). It is a subdivision of a physiographic subsection.
legume	An herb, shrub, or tree of the family Leguminous bearing nodules on the roots that contains nitrogen fixing bacteria.
M	
management area (MA)	An area that has direction to achieve a common goal throughout. The entire Forest is divided into management areas; each is given a description, and the policies and management prescriptions relating to their use are listed with them.
management indicator species (MIS)	Plant and animal species, communities, or special habitats selected for emphasis in planning, and which are monitored during forest plan implementation in order to assess the effects of management activities on their populations and the populations of other species with similar habitat needs which they may represent. (FSH 2620.5)
management prescription (MP)	A combination of specific multiple-use directions applicable to one or management areas described in a Forest Plan; generally includes but is not limited to goals, objectives, standards and guidelines and possible management practices.
mesic	A soil moisture class (moisture modifier) used to describe relative soil moisture availability. Soil that is moderately well drained; water is removed from the soil somewhat slowly, so that the soil profile is wet for a small but significant part of the time. Mesic soils are productive with high site productivity indices, but often rare in the Ozarks in being restricted to north and east-facing slopes and large floodplains.
N	
National Environmental Policy Act of 1969 (NEPA)	Public law that outlines specific procedures for integrating environmental considerations into agency planning. Congress passed NEPA in 1969 to encourage productive and enjoyable harmony between people and their environment. One of the major tenets of NEPA is its emphasis on public disclosure of possible environmental effects of any major action on public land. The Act requires a statement of possible environmental effects to be released to the public and other agencies for review and comment.
National Forest System	National Forests, National Grasslands, and other related lands for which the

Appendix A - Glossary of Terms Used	
land (NFS)	Forest Service is assigned administrative responsibility.
National Forest System Road	A road under the jurisdiction of the Forest Service and determined to be needed for long-term motor vehicle access. (Also referred to as a system road)
National Register of Historic Places	A listing maintained by the U.S.D.I. National Park Service of areas which have been designated as being of historical significance. The Register includes places of local and state significance as well as those of value to the Nation as a whole.
native grasses	Grasses that originated in the area in which they are found, i.e., were not introduced and naturally occur in that area.
non-system road	A road on National Forest System lands that is not managed as part of the Forest transportation system, such as unplanned roads, abandoned travel ways, and off-road vehicle tracks that have not been designated and managed as a trail, and those roads that were once under permit or authorization and were not decommissioned upon the termination of the authorization. (Also referred to as an unclassified road)
O	
old growth	Characterized by the later stages of stand development which may include: large trees, wide variation in tree species, sizes and spacing, presence or absence of large-sizes dead standing and fallen trees, decadence in the form of broken or deformed tops or boles and root decay, multiple canopy layers, presence or absence of midstory or understory, ground layer, canopy gaps, and understory patchiness.
open land management	Application of management activities with the intent of maintaining or converting grass and/or herbaceous vegetation regardless of the historic natural vegetation occurring on the site. For example: using prescribed fire or mechanical methods to prevent exotic species or honey locust from invading a fescue pasture with the intent to plant native warm season grasses for wildlife purposes.
P	
pasture	A grazing area enclosed and separated from other areas by fencing or other barriers.
project	A project is a combination of one or more management practices and associated support activities to meet the intent of the Forest Plan.
Project area	Similar features in combination that reflects the basic land characteristics and existing conditions. These features are combined for the purpose of analysis in formulating alternatives and monitoring results.
Proposed species	Any species of fish, wildlife, or plant that is proposed in the FEDERAL REGISTER to be listed under section 4 of the Endangered Species Act.
R	
range management	A distinct discipline founded on ecological principles with the objective of sustainable use of rangelands and related resources for various purposes.
Range Management Unit (RMU)	Any management area with range management objectives such as grazing allotments.
Ranger District	Administrative subdivision of a National Forest supervised by a District Ranger who reports to a Forest Supervisor.
riparian area	A term used by the Forest Service that includes stream channels, lakes, adjacent riparian ecosystem, floodplain, and wetlands.
road	A motor vehicle travelway over 50 inches wide, unless designated or managed

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	as a trail. A road may be classified, unclassified, or temporary.
rutting	Soil disturbance where the soil is puddled and the topsoil and/or a portion of the subsoil removed.
S	
savanna	A prairie-like natural community in which 10 to 30% is covered in trees characterized by wide crowns and spreading limbs, generally associated with level to gently rolling topography. Dominant trees include bur, chinquapin, post, and white oaks.
sensitive species (RFSS)	Those plant and animal species identified by a Regional Forester for which population viability is a concern, as evidenced by: significant current or predicted downward trends in population numbers or density; or significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.
snags	Dead trees with or without cavities, at least 6 inches in diameter and at least 10 feet in height.
stand	A community of trees or other vegetation possessing sufficient uniformity as regards composition, constitution, age, spatial arrangement, or condition, to be distinguishable from adjacent communities, so forming a silvicultural or management entity.
standards and guidelines (S&Gs)	(Standards) Requirements found in a Forest Plan, which impose limits on natural resource management activities, generally for environmental protection. Standards are required limits to activities. These limitations allow the Forest to reach the desired conditions and objectives. Standards also ensure compliance with laws, regulations, executive orders, and policy direction. Deviations from standards must be analyzed and documented in Forest Plan amendments. (Guidelines) Guidelines are preferable limits to management actions that may be followed to achieve desired conditions. Guidelines are generally expected to be carried out. They help the Forest reach the desired conditions and objectives in a way that permits operational flexibility to respond to variations over time. Deviations from guidelines must be analyzed during project-level analysis and documented in a project decision document, but deviations do not require a Forest Plan amendment.
surface soil	The A, E, or combinations of those horizons.
T	
threatened species (T)	Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range and which has been designated in the Federal Register under the Endangered Species Act.
U	
understory	The trees and other woody species growing under a cover of foliage formed collectively by the upper portion of adjacent trees and other woody growth.
V	
viable population	A population, which has adequate numbers and dispersion of reproductive individuals to ensure the continued existence of the species population on the planning area.
W	
warm-season plant	A plant that makes most or all its growth during late spring, summer or early fall and is usually dormant in winter.
woodland:	A natural community in which 30 to 90 percent of the landscape is covered in

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	trees and often containing a dense woodland grass/sedge/and herb ground layer resulting from frequent fires. The understory is sparse to dense depending on fire frequency. This natural community is often found on steep upper slopes with southerly aspects, narrow ridges, broad ridges, and fire prone landscapes.

Appendix B: References

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Appendix C: Project Activity Table and Project Maps

Table 3: Cedar Creek Range East Project – Treatment Areas		
Allotment Number	Pasture Number	Pasture Acres
101	1	40
101	2	54
101	15	13
101	16	38
102	3	103
102	4	78
102	17	51
102	18	58
103	5	151
103	7	21
103	13	87
103	14	31
104	8	65
104	9	66
104	20S	14
104	20N	52
105	10	40
105	11	21
105	12	18
106	19	66
201	1	91
201	3	63
202	2	116
202	5E	29
202	5W	38
202	8	35
202	9	59
203	6	109
203	7S	50
203	7N	40
204	10	96
204	11W	48
204	11E	37
205	4	39
301	2	38
401	1	52
401	2	41

Table 3: Cedar Creek Range East Project – Treatment Areas

Allotment Number	Pasture Number	Pasture Acres
401	3	55
401	4	57
501	1	64
501	2	128
501	3	54
502	4	116
502	5	74
502	9	26
503	6	64
503	7	25
503	8	63
601	1	41
601	2	32
601	3	32
601	4	69
701	1	35
701	7	36
702	2	60
702	3	55
702	4	62
702	5	44
702	6	61
801	1	30
801	2	108
801	3	41
802	4	32
802	5	75
802	6E	35
802	6W	39
802	7	28
802	8	29
901	1	78
901	2	59
901	3	34
901	4	60
901	5	98
901	6	75
1001	1	79
1001	2	107

Table 3: Cedar Creek Range East Project – Treatment Areas

Allotment Number	Pasture Number	Pasture Acres
1001	3	34
1001	7N	47
1001	7S	29
1901	1	30
1901	2	64
1901	3N	34
1901	3S	44
1901	4	48
1901	5	37
2001	1	37
Total		4712

Appendix D: Response to Comments Spreadsheet